The Role of Service Experience in Post-Training Attrition in the Army and Air Force

Richard Buddin

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Develops a multivariate model describing the effects of individual characteristics, duty location assignments, career turbulence, and military occupational assignments on post-training enlisted male attrition in the Army and Air Force. The report concludes that military occupation and duty location are significantly correlated with attrition, after controlling for individual characteristics. The role of turbulence cannot be distinguished with current measures. Among individual characteristics, high school graduates have much lower attrition than nongraduates in all service occupational areas. Attrition varies insignificantly with mental test category, after controlling for other background and service experiences. Participation in a delayed entry program prior to entering the military substantially reduces the likelihood of post-training attrition. (See also R-2468.)
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PREFACE

This report was prepared as part of The Rand Corporation's Manpower, Mobilization, and Readiness Program, sponsored by the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics)—OASD(MRA&L). The study was carried out under Task Order Nos. 80-I-7 and 81-II-1, "First-Term Enlisted Attrition." With manpower issues assuming an ever greater importance in defense planning and budgeting, the purpose of this study program is to develop broad strategies and specific solutions for dealing with present and future defense manpower problems.

SUMMARY

Since the end of the military draft in 1973, the military services have experienced unexpectedly high rates of first-term enlisted attrition. Recent experience has led military planners to expect nearly 40 percent of each accession cohort to leave before the end of their enlistment term. High attrition rates imply increased costs and policy adjustments throughout the military manpower system, and their effects pervade recruiting, training, force readiness and, ultimately, retention policies.

This report examines the relative contributions of various service experiences and individual background characteristics to *post-training enlisted male attrition*. The analysis is based on the FY75 Cohort File created by the Defense Manpower Data Center, which contains information on nonprior service enlisted accessions for FY 1975. The file makes it possible to trace the effects of military experience on attrition behavior throughout the first term of enlistment.

Post-training attrition refers to recruits who complete their advanced individual training in a military occupational specialty but leave the military before the end of their enlistment term. Such attrition is particularly important for two reasons. First, post-training attrition is costly to the services. It costs the services much more to lose a technically qualified specialist than to lose a trainee. Further, attrition shrinks the services' pool of specialists; to maintain manning at desired levels, the services may therefore have to devote more time, money, and personnel to recruiting, and often must offer greater enlistment incentives. Second, if the recruit finishes training without either "quitting" or being "fired" by the service, he enters the more steady-state post-training phase, which is more amenable to policy adjustments.

The study uses a multivariate attrition model to describe the effects of individual characteristics and military environment on attrition. The military environment is represented by the recruit's duty location assignments, career turbulence (e.g., job reassignments and retraining), and military occupational assignments. This approach allows us to measure the relative contribution to attrition of a single characteristic, such as military occupation, while simultaneously controlling for other individual characteristics (e.g., education and age), duty location assignments, and career turbulence.

The parameters of the attrition model are estimated for different occupational groups, which consist of similar occupational specialties in the Army and Air Force. This methodology facilitates a comparison of occupational attrition across services. These comparisons involve the relative contribution of individual characteristics, career turbulence, and duty location to attrition in the same occupational areas of the two services. The relative influences of these variables on attrition are also compared across occupational groups in each service.

RESULTS

In the post-training attrition model, selected variables represent various aspects of individual background experiences. These experiences include the recruit's region of origin, age at entry into the military, educational attainment, race, mental aptitude, and family status (marital status and presence of children). Our analysis of post-training attrition suggests the following:

- Army recruits who enter the service before reaching age 18 have 5 percent to 7 percent higher post-training attrition rates than 18-year-old recruits in most occupational groups. In the Air Force, young recruits are considerably less attrition-prone than their Army counterparts.
- Recruits without high school diplomas are at least 10 percent more likely to discharge early than high school graduates in all occupational areas of the Army and Air Force.
- Attrition rates do not vary significantly with race in most occupational areas of the Army and Air Force. Blacks, however, are about 4 percent less likely than whites to leave early from Army combat arms.
- When other individual characteristics are held constant, mental test category is generally not a significant determinant of the relative level of attrition. In Army combat arms, however, lower-category recruits have a higher attrition level than recruits in high categories.
- Married recruits are 3 to 8 percent less likely than single recruits to leave before the end of their enlistment term. The inhibiting influence of marriage on attrition is largely offset if the recruit is a parent, however.

These results indicate that individual background characteristics are highly correlated with relative post-training attrition in the Army and Air Force.

In general, individual characteristics tend to have consistent qualitative and quantitative implications for attrition in virtually all occupational groups in both services. Although the *level* of attrition varies substantially across occupational groups and services, the relative contribution of a given characteristic, e.g., educational attainment, to the attrition level remains consistent. This implies that overall attrition cannot be attenuated by reassigning recruits with certain characteristics to occupations where these attributes less positively affect attrition. For instance, if we found that high school graduates had relatively high post-training attrition rates (as compared with nongraduates) in maintenance specialties but low rates in supply specialties, it might seem plausible to channel more graduates into supply as a way to reduce overall post-training attrition. Our results suggest, however, that such reassignment will not affect the aggregate level of attrition.

Another aspect of the recruit's pre-service experiences is represented by his entry status at accession, which includes his term of enlistment and participation in a delayed entry program (DEP). DEP is a common military enlistment program that allows a recruit to wait up to twelve months after enlistment before entering active duty. DEP participants have a 5 to 10 percent lower attrition probability than nonparticipants, depending on their occupational assignment. Four-year enlistees are significantly more likely to discharge early than three-year enlistees.

Post-training attrition rates vary significantly with duty location, after controlling for individual characteristics, career turbulence, and occupation. Air Force assignments in Europe and the Pacific are associated with lower attrition rates in all occupational areas; the size of the influence ranges from 8 to 27 percent. While duty location has a significant effect on Army attrition, the effect is not systematic across occupational groups. These results suggest that the environmental, vocational, and command factors associated with a duty assignment are important determinants of the overall attrition level.

In both the Army and Air Force, attrition levels vary significantly both across occupational groups and across occupational specialties within most groups, after controlling for individual characteristics, career turbulence, and duty assignments. In some occupational groups, such as combat arms, the differences in relative attrition level among occupational specialties are

not statistically significant. The observed, unconditional differences in attrition by occupation within these job groups are primarily attributable to differences in background characteristics and duty locations of individuals in these jobs. Thus, a recruit's specific job assignment in the combat group has *no* statistically significant influence on his attrition probability. In most other job groups, however, the experiences associated with a specific occupational assignment will significantly influence the likelihood of a recruit's completing his enlistment term.

POLICY IMPLICATIONS

The results have four implications for policymakers. First, as mentioned above, it does not appear possible to reduce attrition appreciably by reshuffling recruits' assignments in hopes of dampening the effects of individual characteristics; those effects persist regardless. Second, the observed relationship between individual characteristics and post-training attrition indicates that more stringent accession screens could reduce the overall attrition level, but that the costs of more intensive recruiting and screening, and of added enlistment incentives, may be prohibitively high. Third, because attrition varies by duty location, it may be possible to reduce attrition rates by changing personnel practices to encourage recruits to remain in less popular locations. Finally, because attrition also varies by occupation, it may be possible to reduce the overall attrition level by either altering the mix of military occupations held by new recruits or enhancing the attractiveness of high-attrition occupations.

These results suggest that it would be useful to conduct a more detailed inquiry into the factors that precipitate unusually high (or low) attrition levels in different locations and occupations. To the extent that attrition differences are related to military programs and environments, attrition management policies could be designed to replicate desirable factors and reduce overall attrition levels.

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CONTENTS

TABLES

I. INTRODUCTION

Since the end of the military draft in 1973, the military services have experienced unexpectedly high rates of first-term enlisted attrition. The nonprior-service male attrition rate increased from 30 percent for the FY71 accession cohort to 40 percent for the FY74 accession cohort. Since FY74, the attrition rate has stabilized but remains at a level that most defense manpower planners consider excessive.

High attrition rates imply increased costs and policy adjustments throughout the manpower system. The recruiting effort expands to replace recruits who leave early. As trained recruits leave the services, personnel and funds are diverted to train replacements. As the recruiting and training phases proceed, the field readiness of units is diminished. When field replacements become available to "replace" early discharges, the new recruits may require field experience to become proficient. The same attrition problems with their predecessors also apply to the new recruits: 40 percent of the cohort will leave early and will in turn require replacements. Finally, high attrition levels affect the flexibility and cost of retention policy options. As the pool of trained servicemen dwindles, the services have to intensify the retention effort if they are to man the career enlisted ranks at desired levels. These systemwide costs of attrition are unquestionably large.

Large as those costs are, the costs of information make it impossible and undesirable to eliminate attrition completely. At the time of enlistment, both parties to the contract presume that they will have a mutually satisfactory relationship, but the truth remains to be seen. We assume that, as time passes, both parties gain information for reappraising their relationship. The services gain information on a recruit's productivity and his ability to adapt to military life; the recruit acquires a skill and deals with the demands of military life. As the learning process continues, one party or the other may decide that the costs of continued service are beginning to outweigh the benefits. Enlistees may become disaffected and quit by inducing early discharge; the services will sift through each accession cohort and eliminate those not suited for military life. Ideally, then, attrition should not be zero but should be managed to retain the most productive members and minimize the costs of "desired" attrition.

If the military is to ameliorate excessive attrition, it must develop improved methods of attrition management. To do so will require information on the separate effects of the military environment and individual characteristics on the likelihood of attrition. Are some *occupations or locations* inherently attrition-prone? If this is so, it may be possible to change personnel practices to offer greater incentives for men to remain in them. Alternatively, is attrition high in some occupations or locations not because they are inherently unsatisfactory, but because military policy channels attrition-prone *individuals* into them? In that case, it would be more appropriate to consider alternative recruiting screens or manning configurations (e.g., more reliance on career enlisted personnel) to contain the attrition problem.

This research begins to assess the influence of military environment and individual background characteristics on the likelihood of attrition. The effort focuses on *post-training enlisted male attrition*.[1] Although female attrition is also a problem, the military services remain predominantly male, and the crux of the attrition problem is the male recruit. Post-training

[1]Post-training attrition refers to individuals who successfully complete advanced individual training in a military occupational specialty, but leave the military prior to the completion of their enlistment term.

attrition is addressed, because it costs the military much more to lose a technically qualified specialist than to lose a trainee. We investigate the correlations between occupational assignment and duty location and post-training attrition, after controlling for systematic differences among individuals (i.e., personal attributes such as educational attainment, aptitude, and age).

Many previous studies of first-term enlisted attrition (e.g., Lockman (1978), Sinaiko (1977), and Warner (1976)) have concentrated primarily on the relation of individual characteristics to attrition. By neglecting experiences within the service, these authors seem to assume implicitly that attrition behavior is determined by the recruits' individual characteristics. Given this assumption, the only prospective attrition management option is to tighten accession screens so as to reduce or eliminate attrition-prone population groups. That option is not likely to minimize the costs of attrition, however, because it ignores service experiences. The military should not forgo the option of adjusting the service environment as a policy tool. Further, control for service experience is probably a prerequisite for accurate assessment of the role of individual characteristics in attrition. This report offers a multivariate analysis that begins to address these issues.

Previous studies may also be misleading because of their persistent focus on early portions of the enlistment term (i.e., training attrition or first-year losses). Groups with high or low initial attrition levels may subsequently have relatively higher or lower levels as the term of service proceeds.

This report studies the role of various military work environments as well as individual characteristics in post-training attrition behavior. The recruit's work environment is represented by his military occupation, duty location, and career turbulence (e.g., job reassignments and retraining). The research suggests that attrition does vary by military occupation and duty location after controlling for individual characteristics. The role of career turbulence is unclear and requires more meaningful turbulence measures than those currently available. Among individual characteristics, high school graduates have relative post-training attrition rates approximately 10 percent lower than those of nongraduates. When other background and inservice experiences are held constant, performance on armed forces mental tests is generally not significantly related to post-training attrition.

The research does not develop or test a comprehensive theory of post-training attrition behavior. Instead, we use a specially constructed longitudinal data file to describe the patterns and correlates of post-training attrition. The report offers working hypotheses that are consistent with the observed results. Often, however, several hypotheses are consistent with a particular observed result, in which case no policy recommendation is possible.

The remainder of this report contains four sections. Section II describes the data set used in the analysis. Section III describes factors associated with post-training attrition. Section IV introduces a multivariate model of the attrition process to separate the *relative* effects of individual characteristics, duty location, and military occupation on attrition. The final section presents conclusions and suggestions for further research.

II. DATA

The file consists of a longitudinal history of these accessions and includes information from three types of personnel records: the accession record, quarterly master file records, and loss record. Thus, the file contains information on background experiences before accession, a sequence of military experiences, and status at separation from the military. It is therefore possible to trace the effects of military experiences on attrition behavior throughout the first term of enlistment.

The accession record contains a profile of the individual's background characteristics at accession. Important variables include:

- Census region and district of origin
- Home state
- Age at entry
- Highest year of education
- Race
- Ethnicity
- Marital status
- Armed Forces Qualifying Test (AFQT) percentile
- Date of accession (day, month, and year)
- Entering pay grade
- Term of service
- Armed Forces Entrance Examination Station (AFEES)
- Participation in delayed entry program.

The file contains all nonprior service accession enlisted records for the period from October 1974 through September 1975.

The file also contains quarterly master files for all quarters that the recruit was on active service. The file has been updated through September 1979; hence, it includes quarterly information on inservice experiences for virtually all three- and four-year-term enlistments in the FY75 accession cohort. A few members of the cohort have not reached the estimated term of service (ETS), because they enlisted for more than four years or their completion date was adjusted beyond September 1979. The following information is available for each quarterly master file:

- Primary (DoD) occupation code
- Duty (DoD) occupation code
- Current pay grade
- Marital status
- Number of dependents
- Military occupation code
- Date of achieving current pay grade
- Unit identification code (UIC)
- Base active service date (adjusted date for the start of the term of service)
- Date of quarterly master file.

The quarterly master file is a snapshot of the recruit taken at the end of each calendar quarter; it simply reports his current status. The number of quarterly master file records is proportional to the length of service (LOS); that is, if a recruit leaves early his cohort file contains fewer quarterly observations than if he remains to ETS.

The final input into the cohort file is the loss record created by DMDC when an individual leaves active duty. The loss record resembles the quarterly master record, but includes the following additional information:

- Inter-Service Separation Code (reason for separation)
- Separation date
- Character of service
- Reenlistment eligibility.

Loss records are created for all discharged recruits either when they reach ETS or when they separate early.

To identify the duty assignment of recruits, the UIC from the master and loss records was matched to DMDC's UIC Master File Extract. This Extract provides a mapping of UICs into location assignments. The location information was then merged with the accession, master file, and loss records to form a working analysis file.

The working sample for the post-training attrition analysis consists of all male recruits who became fully qualified at an occupation. Recruits were excluded from the analysis if they enrolled in officer candidate school. The Army sample was restricted to three- and four-year enlistees, eliminating approximately 9.8 percent of the cohort on two-year-term enlistments. The Air Force sample was restricted to four-year obligators, who make up nearly 90 percent of the cohort. With these restrictions, sample size was 89,416 for the Army and 47,448 for the Air Force. Because the Army sample was large, a 50 percent random sample was selected for analysis efficiency. In the tabular analysis of occupation and the multivariate analysis, recruits were excluded from the analysis if their initial Army Military Occupational Specialty (MOS) or three-digit Air Force Specialty Code (AFSC) comprised less than two-tenths of one percent of the post-training cohort. It was determined that any analysis of attrition in these very small occupations would be inappropriate.[1] The sample sizes for the occupational analysis are 38,560 for the Army and 44,600 for the Air Force. DMDC defines post-training attrition as a separation more than six months before ETS for recruits who become fully qualified in a MOS or AFSC.

[1]A major purpose of this research is to determine whether post-training attrition rates vary significantly across MOS and AFSC categories after controlling for individual characteristics and duty assignments. In very small occupational groups, it would have been impossible to meaningfully impose these controls. While small occupational groups could have been combined into an "other" category, this alternative would require the combination of recruits with very dissimilar jobs. Any comparison of attrition rates in the conglomerate "other" category and a well-defined MOS or AFSC would have been suspect.

III. PATTERNS OF POST-TRAINING ATTRITION

Although the Army and Air Force differ in their manning requirements and deployment policies, both services experience persistently high attrition rates. This section compares and contrasts differences in post-training attrition rates across various factors that may be associated with attrition. It presents unconditional attrition rates for recruits with various characteristics without controlling for other variables correlated with the attrition process. Section IV presents a multivariate model that controls for these effects simultaneously.

COMPARISON OF TRAINING AND POST-TRAINING ATTRITION

Table 1 presents the status of the FY75 accession cohort as of September 1979. The Army has a substantially higher attrition rate during the training portion of the term than the Air Force (16.8 percent vs. 9.3 percent). The difference may be partly due to the Army's greater difficulty in attracting qualified recruits. It may also reflect a more pronounced and accelerated Army policy of detecting and dismissing *potentially* unproductive recruits. If the Army is doing so successfully during training, then the training dismissal policy has a dampening influence on post-training attrition.

Table 1

MILITARY STATUS OF FY75 ACCESSION COHORT FOR THE ARMY AND AIR FORCE IN SEPTEMBER 1979

	Air Force		Army	
Status	No.	%	No.	%
Separation before or during AIT	6,652	9.3	25,616	16.8
Non-ETS separation after AIT	22,508	31.3	32,534	21.3
ETS separation	21,562	30.0	65,453	42.9
Separation after ETS	359	0.0	3,570	2.3
On active duty past ETS	16,179	22.5	25,340	16.6
On active duty before ETS	4,552	6.5	14	0.0
Total	71,812		152,527	

The Air Force gets a higher percentage of the entering cohort through training than the Army, but experiences a higher attrition rate in the post-training phase of the term, partly because virtually all Air Force enlistments are for four years, as contrasted with a mix of three- and four-year enlistments in the Army. Since Air Force recruits are at risk of discharge for a

longer average time, the attrition rate should be somewhat higher (other factors held constant). Even after 36 months, however, the Air Force unconditional post-training attrition rate (26.4 percent) still exceeds that of the Army (20.2 percent).

The Army's high training attrition rate implies a large commitment of resources to recruits who make virtually no contribution to force productivity. To fill 100 assignment slots, the Army must recruit 120 men. The Air Force can do so with 110.

Any cost-benefit comparisons of Army and Air Force patterns remain ambiguous at this point, however. Although the Army saves on explicit training costs through attrition during training, it receives less return in the form of recruit contribution to force productivity. The Air Force completely loses the outlays for training, but presumably accrues some returns in the form of post-training productivity before attrition.

IMPLICATIONS OF ATTRITION BEHAVIOR FOR RETENTION

High attrition rates imply a correspondingly small pool of recruits eligible for reenlistment. The retention rates (reenlistments/size of entering cohort) for FY75 were 18.5 percent and 21.8 percent for the Army and Air Force, respectively. Of the recruits who were not discharged prior to ETS, 36.6 percent of the Air Force enlistees reenlisted, as did 29.8 percent in the Army. Any policy change that would lessen the current attrition rate by solving productivity or attitudinal problems of currently discharged recruits would have the indirect benefit of easing the task of filling career enlisted positions by increasing the pool of eligibles available for reenlistment.

PRE-SERVICE EXPERIENCES AND INDIVIDUAL ATTRIBUTES

Three pre-service variables are highly correlated with post-training attrition: educational attainment, mental category, and participation in a delayed entry program (DEP) prior to enlistment. Other pre-service variables are introduced in the multivariate model in Sec. IV, but these three deserve special attention.

Table 2 demonstrates the strong relation between educational attainment and attrition. Recruits who lack a traditional high school diploma (did not graduate, or hold high school equivalence certificates) have a substantially higher attrition rate than the modal group of high school graduates. In the Air Force, nearly 50 percent of the non-high school graduates who become fully qualified in an occupation leave before the end of their term. The Air Force is noticeably more successful in attracting high school graduates than the Army, but Air Force high school graduates have post-training attrition levels rivaling those of Army high school dropouts.

Table 3 reports attrition rates by mental test category. The Air Force is again more successful in attracting "prime" recruits: 44.7 percent of the Air Force recruits are in mental categories I and II, as compared with 31.0 percent in the Army. The simple relationship between mental test ability and attrition is negative. The lone exception to the rule is mental category IV in the Army, which has an attrition rate below the mean. The result may suggest that the Army is screening recruits in test group IV more severely on other attrition-related variables (such as education and age at entry) either at accession or during training.

Individual participation in a delayed entry program (DEP) is negatively related to post-training attrition. The services allow a recruit to wait up to twelve months after enlistment before entering active duty. The delay typically occurs either to await openings in a given

Table 2

POST-TRAINING ATTRITION RATES BY EDUCATION LEVEL IN THE ARMY AND AIR FORCE

(In percent)

	Army		Air Force	
Education Level	Attrition	Cohort	Attrition	Cohort
Non-high school graduate	32.9	26.5	47.5	6.9
High school equivalence certificate	33.7	8.0	47.3	5.0
High school graduate	14.8	58.9	30.6	83.6
Some college (or post-secondary education)	10.8	6.5	25.3	4.5
Total	20.8		32.3	

Table 3

POST-TRAINING ATTRITION RATES BY MENTAL TEST CATEGORY IN THE ARMY AND AIR FORCE

(In percent)

	Army		Air Force	
Mental Category	Attrition	Cohort	Attrition	Cohort
I	11.2	2.8	24.9	3.7
II	17.2	28.2	31.4	41.0
IIIA	22.3	26.5	33.3	31.4
IIIB	23.8	35.4	33.9	23.4
IV	18.9	7.1	34.3	0.5
Total	20.8		32.3	

occupation or for the recruit to take some leisure or finish school before entering the service. Table 4 reports the relation between DEP and attrition. DEP is much more prevalent in the Air Force than the Army (89.5 percent participation vs. 61.0 percent). Recruits who participated in DEP in the Army for more than 3 months are 15.9 percent less likely to leave early than non-DEP participants. Air Force recruits are also less likely to leave if they are in DEP. In each

Table 4

POST-TRAINING ATTRITION RATES BY MONTHS IN DELAYED ENTRY PROGRAM (DEP) IN THE ARMY AND AIR FORCE
(In percent)

	Army		Air Force	
Months in DEP	Attrition	Cohort	Attrition	Cohort
0	27.1	38.8	36.4	12.5
1-3	18.4	47.9	33.9	54.4
>3	11.2	13.3	28.3	33.1
Total	20.8		32.3	

service, the post-training attrition level is also inversely related to *time* in DEP. Since DEP and occupational choice are linked, the simple correlation between DEP participation and attrition may overstate the importance of DEP on attrition.

DUTY LOCATION

The inservice experiences associated with a recruit's duty assignment are likely to affect his job satisfaction and performance. The mission, job pressures, and esprit de corps of units may vary substantially among locations. Commands may also differ in their handling of discipline problems, dealing with infractions more harshly in some locations than in others. Some commands may be more successful in remedying potential problems. Recruits may also find some locations inherently unattractive because of local living conditions beyond military control.

Previous studies of attrition[1] have ignored the influence of duty location on attrition. To our knowledge, the multivariate model in Sec. IV is the first regression model of attrition to include any duty location variables other than variables to identify the training base.

To examine how attrition rates vary across duty locations, variables were incorporated into the analysis corresponding to the recruit's first unit assignment after training and his last assignment before discharge. The definition of the "last" duty location variable was complicated by the fact that recruits are typically not discharged from non-CONUS (non-Continental United States) bases. It appears that certain CONUS locations serve only as exit stations and thus do not represent experiences relevant to the determination of attrition. For example, examination of the data revealed a pattern of recruits assigned to Germany for several successive quarters and then assigned to a CONUS unit on their loss record. In these cases, the base of discharge is probably not related to the reason for discharge. Consequently, the decision was

[1]E.g., Lockman (1978), Sinaiko (1977), Warner (1976).

made to check the two quarterly master files preceding discharge and recode the geography variable to the most recent differing location. This decision rule requires a recruit to stay with his discharge unit for at least a full quarter, or the last unit assignment is recoded. The resulting "last" location assignment corresponds as closely as possible with the location of the recruit's work assignment immediately prior to beginning the discharge process.

In each service, some recruits are either not assigned to a unit or the unit assignment is unknown. In these cases, their duty location is unknown, and the location variables are coded as missing.

Table 5 summarizes the relation between attrition and initial duty location in the Army; appendix Tables A.1 and A.2 contain a more detailed reporting by state or country. Recruits who are initially assigned to bases in the Pacific or Europe tend to have a significantly lower chance of early discharge than the average recruit. Initial assignment in the West tends to enhance the chances of early discharge.

Table 5

ATTRITION RATES BY INITIAL POST-TRAINING AREA LOCATION ASSIGNMENTS IN THE ARMY
(In percent)

Area	Attrition	Cohort
CONUS		
Northeast	22.0	1.5
North Central	20.6	5.4
South	20.8	43.8
West	24.6	14.6
Europe	19.9	21.7
East Asia and Pacific	18.2	8.7
Unknown	18.2	4.2
Total	20.8	100.0

The relation between location and Army attrition is more pronounced when the last location assignment is considered. In Table 6, all CONUS locations have a significantly higher attrition level than the average (20.8 percent), and Europe has a significantly lower one. Among CONUS assignments, recruits assigned to the West have a higher chance of early discharge than those in any other census division. Tables A.3 and A.4 show the effect of last duty location on attrition by state and country.

Tables 5 and 6 also show that the Army assignments of the first-term enlisted men are concentrated in the South and Europe. More than 40 percent of the force is stationed in the South, and another 20 to 30 percent is in Europe. The Northeast, North Central, and Pacific assignments receive less than 10 percent each.

Air Force attrition rates vary more widely than the Army rates across geographic locations. Table 7 shows that recruits with initial duty assignment in Europe or the Pacific are approxi-

Table 6

ATTRITION RATES BY FINAL POST-TRAINING AREA LOCATION ASSIGNMENTS IN THE ARMY
(In percent)

Area	Attrition	Cohort
CONUS		
Northeast	24.2	1.6
North Central	24.1	3.5
South	21.5	41.0
West	24.6	15.7
Europe	17.2	29.6
East Asia and Pacific	21.0	7.0
Unknown	22.8	1.6
Total	20.8	100.0

Table 7

ATTRITION RATES BY INITIAL POST-TRAINING AREA LOCATION ASSIGNMENTS IN THE AIR FORCE
(In percent)

Area	Attrition	Cohort
CONUS		
Northeast	33.0	5.7
North Central	36.6	14.2
South	31.7	33.4
West	33.5	27.8
Europe	26.2	6.0
East Asia and Pacific	25.2	3.9
Unknown	31.2	9.0
Total	32.3	100.0

mately 7.5 percent more likely than CONUS assignees to complete their enlistment term. Table 8 indicates that the effect of a non-CONUS last assignment is much more dramatic: The attrition rate for CONUS last assignments in the Air Force is 35.4 percent, in contrast to 17.3 percent for non-CONUS duty locations. Tables A.5 through A.8 present a complete breakdown of attrition rates by state or country for the Air Force.

Non-CONUS assignments have lower post-training attrition rates than CONUS assign-

Table 8

ATTRITION RATES BY FINAL POST-TRAINING AREA LOCATION ASSIGNMENTS IN THE AIR FORCE
(In percent)

Area	Attrition	Cohort
CONUS		
Northeast	33.8	5.7
North Central	40.0	13.6
South	33.8	31.9
West	35.4	26.5
Europe	17.4	9.7
East Asia and Pacific	17.1	7.0
Unknown	34.3	5.5
Total	32.3	100.0

ments in both the Army and Air Force.[2] This result is consistent with the hypotheses that these assignments are inherently more attractive locations for most recruits, the vocational aspects of these locations are more desirable, or these commands deal more effectively with unproductive and disruptive recruits. Alternatively, the low attrition levels in Europe and the Pacific may be a statistical artifact resulting from a nonrandom assignment of individuals to these locations, i.e., the services may consciously or coincidentally assign recruits to Europe and the Pacific who are less likely to discharge early because of their occupation or background characteristics. The multivariate model of Sec. IV allows the separation of the location effects from other factors influencing attrition.[3]

MILITARY OCCUPATION

One of the most important determinants of a recruit's inservice experiences is his military occupation. Jobs differ in command structure, mission, duty flexibility, concept of personnel utilization, and potential for career enhancement. Some jobs provide skills and experience that are directly transferable to the civilian labor market after leaving the service. Other jobs have no civilian counterpart. Ideally, recruits would enter the services with an array of interests and skills that would correspond neatly with the job mix of the modern force, whereupon they would

[2]Chow and Polich (1980) found that location assignment influences reenlistment decisions. The Air Force reenlistment rate is higher for non-CONUS assignees. In the Army, recruits with CONUS assignments are more likely to reenlist.

[3]The model in Sec. IV controls for nonrandom assignment to locations based on age, education, mental category, and other variables in the multivariate model. The analysis does not, however, control for nonrandom assignment based on recruit choice or other characteristics not observed and reported in our data set.

all be content with their assignments. More realistically, some occupations may be more demanding or inherently less attractive than others. The likely result is considerable variance in attrition levels across occupations.

It is difficult to group military occupations for comparisons between occupations and services. Jobs can be identified very narrowly by occupational specialties (MOS or AFSC), or they can be defined into very broad groups, such as combat and noncombat occupations. A mix of the broad and narrow groupings was designed for this research. The very specific job classifications (MOS or AFSC) were mapped into five occupational area groupings constructed from one-digit DoD occupational area codes. The five areas are:

- Skilled technicians (DoD codes 1-4),
- Functional support and administration (DoD code 5),
- Electrical/mechanical equipment repairmen (DoD code 6),
- Craftsmen, service and supply handlers (DoD codes 7-8), and
- Combat arms (DoD code 0).

This approach allows attrition comparisons across very broad categories of job tasks as well as comparison at a very specific (MOS or AFSC) level within an occupational area. The attrition rates of occupational areas can also be compared across services.

Table 9 lists post-training attrition levels and force composition by occupational area. The Army is disproportionately concentrated in combat arms and has fewer skilled technicians than the Air Force. In each service, attrition rates vary significantly with occupational area. In the Air Force, skilled technicians and repairmen have the lowest attrition levels. In the Army, combat arms have the highest attrition rate (26.6 percent as compared with 18.4 percent for the other four areas combined).

Within occupational areas, attrition levels vary substantially across occupational specialties. Tables 10 through 14 show Army attrition rates by MOS in occupational area groups. The attrition level varies from 4.9 percent for teletypewriters (MOS 31J) in the skilled technician area to 27.6 percent for combat engineers (MOS 12B) in the combat arms area.

Air Force attrition rates by AFSC are reported in Tables 15 through 18. The AFSC with the lowest attrition level is radio communications analysis/security (AFSC 202) with a 10.2 percent discharge rate. Several AFSCs lost more than 40 percent of their trained recruits in the FY75 cohort. The highest attrition level is for audiovisual services (AFSC 231) at 44.9 percent.

The occupational tables demonstrate that attrition rates vary across occupational area groups in each service, across services, and within occupational areas in each service. This evidence does *not* demonstrate that occupational assignment is a *determinant* of attrition. The apparent importance of occupation may be illusory if individuals predisposed to discharge early are clustered in a few occupations. The apparent variance in post-training attrition across occupations may also be misleading if some occupations have a disproportionate number of "bad" duty assignments. In this case, the appropriate policy option would be to revise duty assignment strategies, not necessarily to alter the relative attractiveness of seemingly attrition-prone occupations.

We turn now to a multivariate model of attrition behavior to assess the *relative* contribution of individual characteristics, duty location, and military occupation to attrition behavior.

Table 9

Attrition Rates by Occupational Areas in the Army and Air Force

(In percent)

Occupational Area	Army		Air Force	
	Attrition	% of Cohort in Occupation	Attrition	% of Cohort in Occupation
Skilled technicians	17.2	9.2	26.8	23.2
Functional support and administration	17.8	11.3	35.7	19.2
Electrical/mechanical equipment repairmen	19.8	16.0	31.1	25.7
Craftsmen, service, and supply handlers	18.1	12.2	36.6	25.7
Combat arms	26.6	37.6	--	--
Total	20.8	86.3[a]	32.3	93.8[a]

Table 10

Attrition Rates for Skilled Technicians in the Army

Occupation	Code	% Attrition	% Cohort
Radio Teletype Oper.	5C	8.3	0.2
Voice-Radio Oper.	5E	19.1	0.3
Radio Teletype (Non-Morse)	5F	16.3	0.8
Cannon Fire Direction Spec.	13E	18.6	0.6
Ground Surv. Radar Crew	17K	25.3	0.4
Tact. Microwave Repairer	26L	7.2	0.3
Field Comm-Electronics Mech.	31B	16.8	0.6
Teletypewriter	31J	4.9	0.3
Central Office Switchbd Oper.	72C	17.0	0.2
Telecomm. Center Oper.	72E	11.7	1.1
Cartographer	82C	19.7	0.4
Medical Spec.	91B	15.5	2.3
Total		17.2	9.2

Table 11

Attrition Rates for Functional Support and Administrative Personnel in the Army

Occupation	Code	% Attrition	% Cohort
Clerk Typist	71B	15.7	2.8
Chapel Activities Spec.	71M	12.5	0.2
Flight Oper. Coordinator	71P	9.1	0.2
Finance Spec.	73C	10.6	0.5
Personnel Admin. Spec.	75B	16.7	0.6
Personnel Records Spec.	75D	20.2	0.3
Personnel Actions Spec.	75E	12.5	0.2
Material Supply Spec.	76D	13.9	0.6
Stock Control Spec.	76P	19.1	0.5
Special Purpose Supply Spec.	76Q	19.5	0.3
Vehicle Materiel Supply Spec.	76S	22.4	0.5
Aircraft Materiel Supply Spec.	76T	18.5	0.3
Commel Materiel Supply Spec.	76U	16.3	0.3
Storage Spec.	76V	22.2	0.3
Unit Supply Spec.	76Y	20.4	3.7
Total		17.8	11.3

Table 12

Attrition Rates for Electrical/Mechanical Equipment Repairmen in the Army

Occupation	Code	% Attrition	% Cohort
Wire Systems Installer/Oper.	36C	21.4	1.3
Tactical Wire Oper. Spec.	36K	21.4	3.2
Aircraft Subsystems Mechanic	45M	24.1	0.3
Power Gen. Oper/Mechanic	52B	21.4	1.6
Ammunition Spec.	55B	23.8	0.4
Construction Equipment Repairer	62B	22.2	1.3
Lifting/Loading Equipment Oper.	62F	22.1	0.3
Gen. & Wheeled Vehicle Mech.	63B	14.0	2.7
Track Vehicle Mechanic	63C	15.3	0.5
Recovery Spec.	63F	24.7	0.5
Automotive Repairman	63H	15.7	1.1
Utility Helicopter Repairer	67N	18.5	1.5
Medium Helicopter Repairer	67U	11.3	0.4
Observation Helicopter Repairer	67V	18.1	0.4
Attack Helicopter Repairer	67Y	12.0	0.4
Total		19.8	16.0

Table 13

Attrition Rates for Craftsmen, Service, and Supply Handlers in the Army

Occupation	Code	% Attrition	% Cohort
Metal Worker	44B	19.8	0.2
Construction & Util. Worker	51A	22.9	0.6
Carpentry & Masonry Spec.	51B	18.1	0.5
Plumber	51K	23.0	0.3
Electrician	51R	11.2	0.2
Construction Equipment Oper.	62J	20.4	0.2
Rough Ter. Lifter/Loader Oper.	62M	26.3	0.4
Motor Transport Oper.	64M	21.4	3.2
Petroleum Supply Spec.	76W	23.3	0.4
Food Service Spec.	94B	29.3	1.9
Military Police	95B	8.2	3.5
Correctional Spec.	95C	9.3	0.8
Total		18.1	12.2

Table 14

Attrition Rates for Combat Arms in the Army

Occupation	Code	% Attrition	% Cohort
Infantryman	11B	27.3	15.8
Indirect Fire Infantryman	11C	27.4	3.6
Armor Crew	11E	23.8	4.0
Combat Engineer	12B	27.6	4.1
Cannon Crew	13B	26.8	6.4
Lance Missile Crew	15D	23.5	0.3
Pershing Missile Crew	15E	20.0	0.4
Hawk Missile Crew	16D	24.8	0.7
Hawk Missile Fire Control	16E	26.4	0.3
ADA Short Range Missile Crew	16P	26.7	1.3
ADA Short Range Gun Crew	16R	23.3	0.7
Watercraft Oper.	61B	18.8	0.2
Total		26.6	37.6

Table 15

Attrition Rates for Skilled Technicians in the Air Force

Occupation	Code	% Attrition	% Cohort
Radio Comm Analysis/Security	202	10.2	.43
Comm Collection/Systems	207	21.1	1.27
Voice Processing	208	11.9	.50
Audiovisual Services	231	44.9	.45
Weather	251	35.2	.84
Air Traffic	272	16.5	1.42
Command and Control	274	19.4	.21
Aerospace Control & Warning Systems	276	30.9	.67
Telecommunications Operations	291	35.8	1.21
Radio Operations	293	27.8	.23
Ground Radar	303	28.7	.85
Ground Radio Communications	304	29.8	2.52
Electronic Computer Sys Maint	305	21.6	.32
Elect/Elect-Mech Comm & Cryp Eqp Sys	306	34.4	.87
Tele-Comm Sys Control	307	19.3	.74
Missile Electronic Maintenance	316	20.5	.98
Avionic Weapon Delivery Systems	321	20.0	.85
Auto Flight Con/Avionics Instr Sys	325	20.8	.22
Integrated Avionics	326	20.6	.75
Avionic Comm-Navigations Sys	328	26.8	1.47
Training Devices	341	19.1	.40
Nuclear Weapons	463	30.4	.45
Site Development	553	31.5	.23
Fire Protection	571	30.1	2.69
Medical Service	902	29.2	1.45
Radiologic	903	28.1	.26
Medical Laboratory	904	21.5	.43
Dental Technician	981	36.2	.52
Total		26.8	23.21

Table 16

Attrition Rates for Functional Support and Administration in the Air Force

Occupation	Code	% Attrition	% Cohort
Air Operations	271	36.7	.57
Computer Systems	511	18.9	1.12
Traffic Management	602	30.7	.47
Air Transportation	605	37.1	1.35
Supply Management	645	41.5	5.49
Accounting and Finance	672	28.2	1.45
Chapel Management	701	38.3	.27
Administration	702	35.4	6.34
Personnel	732	35.6	1.32
Recreation Services	741	33.8	.32
Medical Administrative	906	34.2	.47
Total		35.7	19.19

Table 17

Attrition Rates for Electrical/Mechanical Equipment Repairmen in the Air Force

Occupation	Code	% Attrition	% of Cohort
Outside Wire Installation & Maint.	361	36.6	.47
Telephone Plant Maint.	362	23.0	.67
Aircraft Accessory Sys.	423	27.1	4.05
Aircraft Propulsion	426	35.1	2.45
Aircraft Maintenance	431	32.5	8.77
Missile Maintenance	443	27.7	.53
Munitions Maintenance	461	28.3	2.00
Weapons Maintenance	462	26.1	3.12
Vehicle Maintenance	472	40.3	1.67
Missile Facilities	541	31.7	.34
Electrical	542	29.9	1.88
Total		31.1	25.74

Table 18

Attrition Rates for Craftsmen, Service, and Supply Handlers in the Air Force

Occupation	Code	% Attrition	% Cohort
Metalworking	427	32.7	2.33
Ref. & Air Conditioning	545	39.8	.61
Mechanical	547	37.4	.74
Structural	552	39.0	1.68
Sanitation	566	38.6	.53
Vehicle Operations	603	39.0	3.12
Supply Services	611	41.0	.25
Food Service	622	38.8	1.19
Fuel	631	34.1	2.10
Security Police	811	36.4	12.31
Medical Material	915	35.3	.29
Aircrew Life Support	922	33.3	.51
Total		36.6	25.65

IV. A MULTIVARIATE ANALYSIS OF POST-TRAINING ATTRITION

Section III confirmed that post-training attrition rates vary substantially by individual characteristics, duty location, and military occupation. This section develops a multivariate attrition model to assess the separate contributions of these factors to attrition. We undertake a detailed statistical examination of post-training attrition in the Army and Air Force.

ANALYSIS FRAMEWORK AND STATISTICAL METHODOLOGY

The attrition process can be viewed as an outgrowth of a reevaluation of the enlistment contract. At accession, the recruit and the service voluntarily agree to an enlistment contract for a specified term of service. Each party foresees a satisfactory relationship for the duration of the term of enlistment, but neither party can fully guarantee it. As time passes, the service accumulates evidence on the recruit's productivity, reliability, and adaptability to the military environment. The recruit gains experience with the demands and rewards of military life, and acquires skills that may enhance his opportunities in the civilian job market.

The underlying hypothesis is that recruits leave the service early either because they perceive better civilian alternatives or because the service perceives unacceptably low recruit productivity. In short, the recruit chooses to "quit" if he believes, ex ante, that his overall well-being will be enhanced. The service will dismiss ("fire") the recruit if his ex ante productivity is believed to be less than his military wage.[1] For recruits who complete their enlistment term, the hypothesis presumes that the recruit and the service perceive the completion of the enlistment contract as preferable to its dissolution.[2]

Enlistment contracts differ from most civilian employment contracts in one important respect. The service requires a formal commitment to serve a given number of years; it does not allow recruits to "quit" before the obligation is completed. Hence, by definition, all attrition is service-induced. This, of course, does not imply that all early discharges are the result of inherently low recruit productivity. Rather, recruits who are dissatisfied with their enlistment contract (and want to "quit") may induce discharge by creating disruptions or intentionally reducing their productivity. As a result, attrition behavior is a combination of "quits" and "fires."[3] Consequently, we are unable to determine whether a given discharge is ultimately

[1]The term "productivity" is used in a very broad sense to include behavior and attitude as well as direct work contributions.

[2]The attrition model is essentially a reformulation of existing economic models of permanent civilian labor turnover. See Jovanovic (1979). The focus on post-training attrition requires the additional condition that the service or recruit does not sever the contract during basic and AIT. During these training periods, both the service and the recruit enhance their knowledge of the value of the job match. Since the training period encompasses a number of months, the recruit and the service have a much clearer understanding of the value of the match than they did at accession. Many of the bad matches have been discovered and eliminated by the end of AIT.

[3]Civilian separations are typically categorized into quits or fires, depending on whether the separation was initiated by the employee or employer. This distinction is suspect in many cases because the costs of the two types of discharges may differ substantially. For example, a dissatisfied employee may induce his "firing" because unemployment compensation is not available to employees who quit. Similarly, some firms may encourage unproductive workers to quit because involuntary discharges typically increase the firm's contribution to state unemployment funds.

induced by the service or by the recruit.[4] With current data, we can only describe factors that are associated with either party becoming dissatisfied with the enlistment contract.

Empirically, the attrition process is summarized by a dichotomous dependent variable that categorizes individuals as stayers (people who remain until the end of their service term) or leavers (individuals discharged early). For the ith individual, the outcome (Y_i) is defined to be one or zero according to whether the individual is discharged early or not. The multivariate statistical model of the attrition level relates Y_i to a vector of explanatory variables (X_i). Traditional least squares estimation procedures are inappropriate for this estimation problem because the least squares assumptions are violated when the dependent variable has a Bernoulli distribution. In particular, the variance of Y_i is not constant but is a function of the expected Y_i, and the predicted values for Y_i are not constrained to lie between zero and one. These difficulties are alleviated by specifying the attrition model in a logistic functional form, where

$$P[Y_i = 1|X_i] = 1/[1 + \exp(-X_i'\beta)] \quad (1)$$

represents the contribution to sample likelihood of leavers, and

$$P[Y_i = 0|X_i] = \exp(-X_i'\beta)/[1 + \exp(-X_i'\beta)] \quad (2)$$

represents the contribution to sample likelihood of stayers. In this model, X_i is a $(k + 1) \times 1$ vector, β is a $(k + 1) \times 1$ vector of estimated parameters, and k denotes the number of estimated characteristics for each individual.

Two estimation methods are commonly used to estimate the parameters in studies of this type: conditional maximum likelihood estimation and discriminant function analysis. Since several empirical studies (Chow (1980), Haggstrom (1974), Halperin et al. (1971)) report similar estimates with both methods, we chose the cheaper, discriminant function method.

The linear discriminant specification of a logistic attrition model is

$$\lambda(X) = \ell n[P(X)/(1 - P(X))] = X\beta ; \quad (3)$$

i.e., the natural logarithm of the odds ratio is a linear function of X. The estimated coefficients are derived by rescaling the least squares coefficients relating Y and X. A more intuitive interpretation of the β coefficients considers the derivative of the probability function (evaluated at the mean attrition probability) with respect to the jth characteristic. This derivative equals

$$\beta_j P(1 - P), \quad (4)$$

where P represents the mean attrition probability. The derivative approximates the effect of each explanatory variable on the average attrition probability (within the relevant occupational area) while holding constant the effect of other X variables.

The discriminant function estimates of the logistic regression coefficients are reported in appendix Tables A.2 and A.3. These coefficients are translated into probabilities using Eq. (4) and reported in Tables 19 through 24. The discriminant variables are defined in appendix Table A.1. The model is estimated separately for each occupational area in each service. This methodology allows us to analyze the effects of individual characteristics, duty location, and career turbulence on attrition levels across occupational areas in each service, and compare parameter estimates of similar occupational areas across services.

[4]The services do report reasons for each discharge, but the system for classifying reasons for discharge is inconsistently applied both across and within services. See Comptroller General (1980).

THE RELATIVE IMPORTANCE OF INDIVIDUAL CHARACTERISTICS

Individual characteristics are likely to influence attrition probability for three reasons. First, some characteristics may represent a taste for military life or environment. Second, some attributes, such as education or mental category, may constrain the recruit's ability to achieve proficiency in a military occupation. Finally, individual characteristics may affect the recruit's perception of the value of civilian opportunities such as wages and the probability of finding a job. Some or all of these factors shape a characteristic's relative contribution to attrition.[5]

Tables 19 and 20 show how post-training attrition rates in the Army and Air Force vary with individual characteristics, while controlling for duty location assignments and military occupation.

First-term enlisted recruits for the Army and Air Force are drawn disproportionately from the South. This overrepresentation may indicate an underlying taste for military life in the South. Alternatively, studies of civilian wages (Smith and Welch (1975, 1978)) reveal substantially lower wages in Southern states, which would tend to enhance the military's attractiveness t Southern youths. In either case, it would be reasonable to expect recruits from the South to have a lower attrition rate than those from other regions, but the regression results generally refute this hypothesis. The effect of region of origin on attrition probability is negligible in virtually all occupational areas. The exception is functional support and administration in the Air Force, where recruits from the North Central and West are 3 to 5 percent more likely to leave than recruits from the South.

Recruits who enter the Army before reaching age 18 are 5 to 7 percent less likely to complete their enlistment term than are recruits 18 and older. These young, presumably less mature, recruits do not have attrition problems, however, in the craftsmen, service, and supply handlers occupational group in the Army. The Air Force has fewer attrition problems with young recruits: Recruits under 18 at entry are significantly more likely to leave early *only* in the craftsmen, service, and supply handlers occupational area—exactly the opposite of the Army.

Recruits over 18 years of age typically have the same attrition tendencies as the 18-year-old modal group. Only rarely are the variable coefficients for recruits older than 18 significant, and in each case the effect is negative. In these cases, older recruit attrition is 2.5 to 4 percent less likely in comparison with 18-year-olds.

Recruits without high school diplomas are much more likely to leave early in all occupational areas in both services. They have demonstrated some level of skill proficiency by completing advanced skill training, but their job performance or behavior is ultimately unsatisfactory.[6] Failure to complete high school may reflect attitudinal or behavior problems or signal low ability or aptitude for the service job. It would be interesting to determine whether nongraduates who complete advanced training are marginal or average trainees. If nongraduates are able to compete equally with graduates in advanced skill training and still have an increased chance of early discharge, then educational attainment is a proxy for factors ultimately creating attitudinal or behavior problems in the military. Alternatively, if nongraduates are deficient in their ability to acquire military skills in training, then

[5]In some cases, several of these types of explanations may underlie the relationship between a given individual characteristic and attrition. In these cases, the underlying mechanism cannot be identified. As a result, we cannot suggest policy prescriptions.

[6]Nongraduates may have inherent tendencies for low job performance or disruptive behavior. Alternatively, some nongraduates may intentionally reduce job performance and create disruptions because they want to "quit" by inducing early discharge.

Table 19

Relative Percentage Contribution of Individual Characteristics to Post-Training Attrition in the Army

Characteristic	Skilled Techs	Support & Admin	Elect/ Mech Equip Repair	Crafts, Service & Supply	Combat Arms
Region of Origin					
Northeast	2.1	1.8	-1.2	-1.1	1.2
North Central	0.2	3.1	2.0	-1.5	1.9
West	1.6	3.7*	1.4	2.0	1.9
South	--	--	--	--	--
Age at Accession					
Age LT 18	7.0*	4.6*	6.0*	1.7	4.8*
Age EQ 18	--	--	--	--	--
Age EQ 19	0.4	-2.6	-0.2	-3.9*	0.7
Age GT 19	-0.8	-3.4*	-0.6	-2.3	0.5
Educational Level					
Not HS grad	14.7*	15.9*	15.6*	18.9*	17.6*
Grad equiv diploma	11.3*	11.8*	10.9*	13.9*	18.6*
HS grad	--	--	--	--	--
Some post HS	-1.5	-0.4	1.3	-2.9	-0.6
Race					
Black	-1.2	2.2	-1.3	-0.5	-4.0*
White	--	--	--	--	--
AFQT Mental Category					
Category I	-6.0	-2.0	-5.2	3.8	-3.0
Category II	--	--	--	--	--
Category IIIA	0.0	-0.5	-0.3	1.7	2.9*
Category IIIB	-1.1	1.2	0.5	3.5*	2.7*
Category IV	1.3	-0.7	2.7	4.8*	3.5
Family Status after AIT					
Married	-4.7*	-3.9*	-6.1*	-3.8*	-3.4*
Single	--	--	--	--	--
More than 2 dependents	1.8	7.7*	3.8*	0.4	2.1
No extra dependents	--	--	--	--	--

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

Table 20

Relative Percentage Contribution of Individual Characteristics to Post-Training Attrition in the Air Force

Characteristic	Skilled Techs	Support & Admin	Elect/ Mech Equip Repair	Crafts, Service & Supply
Region of Origin				
Northeast	0.7	3.0	-0.3	1.5
North Central	-0.4	3.1*	1.5	-0.4
West	-0.5	4.5	-2.2	-1.6
South	--	--	--	--
Age at Accession				
Age LT 18	-0.1	2.1	2.9	5.3*
Age EQ 18	--	--	--	--
Age EQ 19	-1.8	-0.1	-2.6*	-1.3
Age GT 19	-0.9	-1.9	-1.7	-0.9
Education Level				
Not HS grad	12.6*	11.0*	14.0*	16.7*
Grad equiv diploma	9.5*	17.1*	12.5*	17.8*
HS grad	--	--	--	--
Some post HS	-3.4	-2.2	3.1	-10.8*
Race				
Black	-1.6	-2.8*	-1.7	-0.9
White	--	--	--	--
AFQT Mental Category				
Category I	-2.0	-5.4	-9.1*	-2.1
Category II	--	--	--	--
Category IIIA	1.1	-0.4	-0.5	0.3
Category IIIB and IV	2.0	-1.6	-0.3	1.8
Family Status after AIT				
Married	-4.3*	-6.3*	-7.8*	-6.1*
Single	--	--	--	--
More than 2 dependents	4.5*	5.2*	2.0	-0.7
No extra dependents	--	--	--	--

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

educational attainment is probably an indication of the individual's underlying ability to perform in a military career. In the former case, we would hypothesize that dropouts are less able than graduates to cope with the military environment. This type of attrition could be attenuated by different policies of discipline or counseling. In the latter case of inadequate ability, the primary policy tool to reduce post-training attrition is to recruit fewer dropouts (lower overall attrition) or to raise the proficiency standards for completion of advanced training (increase the training attrition of dropouts and reduce the post-training attrition). The policy choice, of course, would depend on the costs of the various alternatives and the value of attrition as a management tool.

Race is one characteristic that is not correlated with attrition. Blacks are 2.8 percent less likely to leave early if their military occupation is in the area of functional support and administration in the Air Force. The attrition rate for blacks in the combat area of the Army is about 4 percent lower than for whites. In all other job areas in both services, blacks and whites have almost the same attrition probabilities.

Mental test group does not appear to be an important correlate of post-training attrition level in most occupational areas in the Army and Air Force. The Air Force exceptions are a 9.1 percent lower attrition rate for Category I than for Category II in the electrical/mechanical equipment repair area and a 1.8 percent higher attrition rate for Categories IIIB and IV than for Category II in the craftsmen, service, and supply handlers area. Mental test ability is notably more important in Army combat arms, where Category IIIA, IIIB, and IV recruits are 2.7 to 3.5 percent more likely to leave than Category II recruits.

The limited importance of mental ability in the multivariate attrition model is in contrast with the significant simple correlation between mental test ability and post-training attrition. Test ability has the anticipated negative correlation with attrition in those cases where the variables are significant, but the relative importance of test ability is dominated by other variables in the multivariate model. The implication is that mental test ability (measured by AFQT) is not a good predictor of post-training attrition in most job areas in the Army and Air Force.

The last group of individual characteristics in the multivariate model are indications of the family status of the individual at the completion of training. The results indicate that recruits who are married at the end of training are 3 to 8 percent less likely than single recruits to leave before ETS. Likely reasons are the added responsibilities of married recruits, their possibly greater maturity, and the higher financial allowances they receive.

The inhibiting influence of marriage on attrition is offset by the presence of children. The dependents variable is significantly positive and contributes to attrition in five of the nine occupational areas. The implication is that married recruits with children are more likely to leave than married recruits with no children. Frequently, in fact, married recruits with children are as likely to leave as single recruits.

In general, the correlations between individual characteristics and attrition in our multivariate model are similar across occupational areas and across both services. While the attrition level varies substantially across occupational areas and service, the relative contribution of a given characteristic, e.g., educational attainment, to the attrition level is very similar to that of the others. This suggests that overall attrition cannot be attenuated through reassignment of recruits with certain characteristics to occupations where these attributes are less highly correlated with attrition. For instance, if we found that a high school diploma were positively correlated with attrition in maintenance jobs but negatively correlated with attrition in supply, it might be possible to channel more educated recruits into supply and thus reduce overall attrition. However, our research to date suggests that this type of reassignment scheme

may not substantially reduce post-training attrition in the Army or Air Force, because individual characteristics tend to have similar effects on attrition in different occupational areas.[7]

THE RELATIVE IMPORTANCE OF DEP AND TERM OF SERVICE

Table 21 shows that DEP participants are less likely to experience early discharge than nonparticipants. Recruits who spend more than three months in DEP are significantly more likely than nonparticipants to complete their enlistment term in all occupational areas of each service. The magnitude of the reduction varies in the Air Force from 4.9 percent for skilled technicians to 11.1 percent for electrical/mechanical equipment repairmen. In the Army, the reduction varies from 6.0 percent for electrical/mechanical equipment repairmen to 10.0 percent for combat arms jobs. One-to-three-month DEP participation also reduces attrition in most job areas, but the size of the reduction is smaller than for recruits who remain in DEP past three months.

Since the model controls for individual job assignments, waiting for universally perceived "better" jobs does not explain significantly lower attrition among DEP participants. Rather, recruits may have different tastes or skills for military jobs, and months in DEP signals a better match of individuals with subsequent assignment. Alternatively, months in DEP may indicate greater maturity and career planning, either because the program appeals to the circumspect recruit or because hesitant and uncertain recruits tend to select out and not report for service. Although all these explanations suggest a negative relation between DEP and attrition, it is impossible to distinguish among the competing hypotheses.

In the Army equations, term of service was introduced to contrast three- and four-year enlistments. Since four-year enlistees are at risk for a longer period of time (that is, the cost of a mistake at recruitment is increased), the expected sign of this variable's coefficient (indicating a four-year contract) is positive after other characteristics and experiences are controlled. The expectation is confirmed, but the magnitude of the coefficients implies that four-year enlistees are more likely to leave during the first three years of their term than are three-year enlistees. In two groups, for example—functional support and administration, and craftsmen, service, and supply handlers—four-year enlistees are 12.7 percent and 13.1 percent more likely to leave than three-year enlistees. Since only 2.8 percent of the four-year enlistees leave during the fourth year in the Army, we can surmise that many of them must be leaving before the end of the third year of service.

THE RELATIVE IMPORTANCE OF DUTY LOCATION

Duty location unambiguously alters the likelihood of attrition after controlling for individual characteristics and occupation. Duty location added significantly to the explanatory power of the multivariate model in each occupational area of the Army and Air Force. F-tests were computed for each equation comparing the unconstrained residual sum of squares (including duty location variables) with the constrained residual sum of squares (where the location parameters are constrained to equal zero). In all cases, the F-statistic was significant at the

[7]In Navy research on attrition, Thomason (1979) has argued that this type of reassignment scheme would reduce attrition by about 6 percent. He found that individual characteristics had quite different effects on attrition in different rating groups.

Table 21

RELATIVE CONTRIBUTION OF DEP STATUS TO POST-TRAINING ATTRITION

DEP Status	Skilled Techs	Support & Admin	Elect/ Mech Equip Repair	Crafts, Service & Supply	Combat Arms
Army Results					
No DEP	--	--	--	--	--
1-3 months in DEP	-5.0*	-4.4*	-3.4*	-1.7	-4.2*
DEP GT 3 months	-8.4*	-7.2*	-6.0*	-6.9*	-10.0*
Three-year term	--	--	--	--	--
Four-year term	7.6*	12.7*	3.9*	13.1*	7.3*
Air Force Results					
No DEP	--	--	--	--	
1-3 months in DEP	-1.8	-3.4*	-5.8*	-1.7	
DEP GT 3 months	-4.9*	-7.2*	-11.1*	-8.8*	

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

5 percent confidence level. Consequently, the observed variability in attrition rates by duty location (discussed in Sec. III) is not a statistical artifact created by a nonrandom assignment of individuals to locations based on age, education, mental category, or other observed individual characteristics. Tables 22 and 23 show the variance in post-training attrition rate by location.

From a policy perspective, we would like to assess the underlying reasons for the significant relative effect of duty location on post-training attrition. Three broad operating mechanisms are consistent with the observed result:

- *Environmental*: Some locations may be inherently more or less attractive to recruits irrespective of their military jobs.
- *Vocational*: Locations may differ substantially in the opportunities or work environments associated with a given job assignment.
- *Command*: The command structures and attrition policies may vary significantly with location.

Some or all of these factors contribute to the observed attrition variance.

The competing explanations for attrition differences by location have different implications for attrition management. If the differences were largely caused by environmental factors, then these attrition costs are implied by the overall manning configuration. Vocational differences could be reduced by policies enhancing the attractiveness of attrition-prone vocational sites.

Table 22

RELATIVE CONTRIBUTION OF INITIAL POST-TRAINING DUTY LOCATION TO POST-TRAINING ATTRITION

Duty Location	Skilled Techs	Support & Admin	Mech Equip Repair	Elect/ Crafts, Service & Supply	Combat Arms
Army Results					
CONUS					
Northeast	3.9	3.8	-2.3	2.7	-0.7
North Central	2.0	-0.5	(a)	-3.7	(a)
South	--	--	--	--	--
West	2.5	1.5	4.6*	-1.2	4.1*
Europe	3.1	5.8*	2.6	1.9	-3.7*
Pacific	-5.8*	-3.2	-4.2*	-6.5*	-6.5*
Air Force Results					
CONUS					
Northeast	-3.9	0.4	1.8	5.0	
North Central	0.4	-3.2	-0.4	4.1*	
South	--	--	--	--	
West	0.4	1.9	1.0	2.6	
Europe	1.2	-8.7*	-2.9	-5.0	
Pacific	-4.8*	-4.0	-2.8	-9.0*	

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

[a]Data for North Central were merged with those for Northeast because of the small number of observations in the separate categories.

Finally, if command factors are responsible for the observed variance in attrition levels by location, policies could be designed to identify and introduce the effective attrition management approaches systemwide.

Current data are not well suited to disentangle the separate effects of environmental, vocational, and command factors on attrition behavior, because we are not able to directly control these factors. Nonetheless, we may be able to gain some insights from observing the pattern of location effects across occupational areas and services. For instance, although command factors probably vary with occupational area and service, the effect of environmental factors should be relatively insensitive to occupational area and service branch. If vocational factors predominate, the effects of a given location on attrition will vary with occupational area. In comparing occupational areas of different services, vocational factors could have similar or different attrition effects on a given location, depending on whether vocational factors were location-specific or service-specific. Thus, a comparison of location effects across occupational

Table 23

Relative Contribution of Final Post-Training Duty Location to Post-Training Attrition

Duty Location	Skilled Techs	Support & Admin	Elect/ Mech Equip Repair	Crafts, Service & Supply	Combat Arms
Army Results					
CONUS					
Northeast	-4.4	-3.2	8.8*	5.2	8.5*
North Central	-5.3	-1.4	(a)	9.1*	(a)
South	--	--	--	--	--
West	1.1	1.8	-0.3	4.2	-0.7
Europe	-8.0*	-10.5*	-5.5*	-6.0*	1.0
Pacific	3.2	1.3	-2.8	6.0*	5.9*
Air Force Results					
CONUS					
Northeast	-0.3	-2.3	-0.8	-1.1	
North Central	6.0*	10.1*	7.4*	5.1	
South	--	--	--	--	
West	1.3	-1.2	-0.2	1.5	
Europe	-13.7*	-20.1*	-14.0*	-22.9*	
Pacific	-8.0*	-23.5*	-17.8*	-27.7*	

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

[a]Data for North Central were merged with those for Northeast because of the small number of observations in the separate categories.

areas and services has implications for the interpretation of location effects on attrition. Unfortunately, such comparisons cannot distinguish vocational and command factors.

In the Army, the effects of first location assignment on Army attrition are not systematic across occupational groups. CONUS sites are indistinguishable for nearly all occupational groups. The exception is initial duty assignment in the West, which tends to increase attrition by about 4 percent in the electrical/mechanical equipment repair and combat arms specialties. Interestingly, Europe has opposing effects depending on occupational group; it increases attrition by 5.8 percent in functional support and administration but reduces it by 3.7 percent in combat arms. The Pacific is significantly negative for three occupational groups and tends to reduce attrition by 4 to 6 percent.

The last Army duty assignment is more consequential than the first, and the attrition rates again vary across occupational groups. Recruits whose last duty assignment is in the Northeast or North Central divisions are 9 percent more likely to leave early than those stationed in the South. The coefficient on Europe is significantly negative for skilled technicians, functional support and administration, and electrical/mechanical equipment repairmen. Final European assignment increases the attrition probability by 6 percent in the craftsmen, service, and supply handler specialties. The Pacific has a positive influence on attrition in the craftsmen, service, and supply handler and combat arms occupational groups.

The overall pattern of relative duty-location effects in the Army is anything but systematic. Locations have differing effects in different job groups, and a given location occasionally has differing effects for first and last duty assignments. To investigate the sensitivity of the location specification, different specifications of the multivariate model were estimated using first and last location variables separately. These results indicated that the overall qualitative effects of the multivariate model are relatively insensitive to a respecification of the location variables.

One interpretation consistent with the Army results is that the significant explanatory power of duty location variables derives either from differences in local command variables or differences in vocational factors. This inference follows from the different effects a given location has on attrition rates among occupational groups. If some locations were simply environmentally attractive, then the inhibiting influence on attrition should be relatively uniform.

In contrast to the Army, relative location effects in the Air Force are qualitatively invariant with occupational area. Except for the craftsmen, service, and supply handler group, there is little distinction among the effects of CONUS first duty location sites on attrition. Also, initial assignments in Europe or the Pacific tend to reduce the likelihood of attrition by 5 to 9 percent in half the occupation groups.

The effects of last Air Force duty location are much more pronounced than the first location variables, however. In each of the four occupational groups, final assignment in the North Central division significantly increases the attrition probability relative to the South. European or Pacific last assignments are associated with lower attrition in all job groups; the size of the effect ranges from 8 to 27 percent. The European and Pacific effects vary in magnitude substantially across job groups. Skilled technicians assigned to Europe or the Pacific have much smaller reductions in their relative attrition level than do craftsmen, service, and supply handlers assigned to Europe or the Pacific.

When alternative specifications of Air Force duty location were tried in the multivariate model, the overall qualitative results were unaffected. When first location is entered separately, North Central is significantly positive, and Europe and Pacific are significantly negative. These results are repeated when last location is entered separately. The similar pattern of location effects across occupational groups is consistent with the hypothesis that Europe and the Pacific are more attractive by environmental criteria. Air Force recruits assigned to the

North Central region, on the other hand, are relatively more likely to leave than other CONUS recruits, after controlling for background characteristics and occupation.[8]

THE RELATIVE IMPORTANCE OF CAREER TURBULENCE

Disruptions in a recruit's work environment can be characterized as career turbulence. Turbulence can take the form of occupational reassignment, retraining, or mere temporary absence from the recruit's military occupation. Turbulence may reduce a recruit's satisfaction or productivity, or both, and consequently enhance his probability of discharge. Unfortunately, current data do not allow us to distinguish between involuntary and voluntary career changes. When a recruit leaves one specialty for another, for example, there is no way of knowing whether his ability was inadequate for the first job, whether he was involuntarily reassigned because of changing military requirements, or whether he chose to leave the first job for one he believed more attractive.[9] Table 24 reveals how post-training attrition rates vary by various measures of career turbulence.

Reassignments to jobs that recruits have not been trained for may also alter the attrition probability. DODCHA (DoD change of occupational assignment) indicates whether the recruit's last duty occupation corresponds to his last primary (trained) occupation. Since this variable may reveal mismatching associated with a man's working in a job other than his trained specialty, one might anticipate a positive relation between DODCHA and attrition. But DODCHA has the predicted positive sign in only one occupational area and is generally significantly negative. Taken at face value, the result suggests that DODCHA indicates that recruits have volunteered for duty in a more desirable job or one with more career potential.

The final career change variable in the multivariate model also concerns job mismatching. Should a recruit be assigned to an occupation where he is not productive or satisfied, he may be retrained in another specialty. This is reflected in a change of MOS or AFSC; accordingly, an indicator variable, MOSCHA (MOS change), has been defined to designate recruits who are retrained. To the extent that MOSCHA indicates job mismatching, the expected relationship between MOSCHA and attrition is positive. Alternatively, if the recruit is better suited to the new job than the first, then MOSCHA may inhibit attrition. Empirically, the effect of MOSCHA on attrition is haphazard: The coefficient is insignificant in four equations, significantly positive in two, and significantly negative in two. A possible explanation for the negative coefficients is that some productive recruits seek retraining in a new field to further their inservice career opportunities.

Changes in a recruit's military career induced by disciplinary infractions are likely to increase the possibility of attrition. A variable indicating whether the end of the man's enlistment term was adjusted backward after accession is BASDCHA (Base Active Service Date Change). These adjustments are typically made to account for time in military prison, in desertion, or AWOL. In short, BASDCHA designates men who have some history of serious disciplinary infractions but are not immediately discharged for the violation. If a serious infraction was a transient event in a recruit's military career, BASDCHA will have no effect

[8]In App. C, the level of post-training attrition is predicted by location, conditional on the individual characteristics, career turbulence, and job assignments of each occupational area. The predictions are based on the multivariate attrition equations reported in Tables A.2 and A.3.

[9]If the perceived "turbulence" reflects recruit choices for career changes, then the turbulence variables are endogenous. While the endogeneity problem complicates the interpretation of the turbulence coefficients, the other regression coefficients are insensitive to the inclusion of the turbulence variables.

Table 24

Relative Contribution of Career Turbulence to Post-Training Attrition

Change	Skilled Techs	Support & Admin	Elect/ Mech Equip Repair	Crafts, Service & Supply	Combat Arms
Army Results					
MOS change	-5.5	-4.5	-4.9	9.4*	-14.0*
No MOS change	--	--	--	--	--
DOD change[a]	-7.9*	1.5	-3.2	-15.5*	-0.7
No DOD change	--	--	--	--	--
BASD change[b]	3.6	14.1*	17.4*	15.4*	17.4*
No BASD change	--	--	--	--	--
Air Force Results					
MOS change	-10.5*	27.0*	-16.6*	- 1.7	
No MOS change	--	--	--	--	
DOD change	2.7	-67.3*	15.2*	-35.9*	
No DOD change	--	--	--	--	
BASD change	34.2*	36.2*	37.0*	32.5*	
No BASD change	--	--	--	--	

NOTES: Each entry represents the percentage difference relative to the reference group, evaluated at the mean post-training attrition rate in each respective occupational area. The reference group in each category has a dashed entry.

Starred entries are associated with coefficients (in Tables A.2 and A.3) that are significantly different from zero.

[a]Change in occupational assignment.

[b]Base active service date change.

on attrition. It is more likely, however, that serious misconduct indicates chronic behavior problems that heighten the chances of early discharge; in this case, the predicted sign for BASDCHA is positive.

In the multivariate model for the Army, the BASDCHA coefficient is significant and positive for all groups but skilled technicians. In the Air Force, recruits are about 35 percent more likely to leave if their active base service date has been adjusted. This may be compared with a figure of 16 percent for an Army recruit. While these results tend to corroborate the chronic delinquency hypothesis, a change in the base active service date is by no means synonymous with early discharge.

THE RELATIVE IMPORTANCE OF MILITARY OCCUPATION

A further question is whether military occupation is correlated with the level of attrition after controlling for individual characteristics, duty location, and career turbulence. The multivariate attrition model provides a two-part answer. First, attrition levels vary across occupational groups in the Army and Air Force. If the multivariate specification is pooled across occupational groups, indicator variables designating occupational groups contribute significantly to the model's explanatory power. This result suggests that the inservice experiences associated with an occupation may significantly alter the likelihood of attrition after controlling for the differences in individual characteristics, duty location, and career turbulence. For example, according to our model, an Air Force recruit who is a skilled technician is about 8.8 percent more likely to leave early than a recruit with the same individual characteristics, duty locations, and career changes, but whose occupation is in the craftsmen, service, and supply handler group.

In addition to the broad comparisons of occupational areas, the multivariate attrition model facilitates attrition comparisons of specific occupational specialties within occupational groups. In six of the nine groups, a set of indicator variables designating individual MOS or AFSC was significant at the 5 percent confidence level.[10] In other words, within an occupational area, recruits with identical individual characteristics, duty locations, and career changes will generally have different predicted attrition probabilities, if they are assigned to different military specialties.[11]

In some groups, however, the set of military specialty variables is not significantly correlated with the overall attrition rate. The group of occupation variables is insignificant for functional support and administration and for combat arms in the Army, and for craftsmen, service, and supply handlers in the Air Force. The observed, unconditional differences in attrition by occupation within these job areas are correlated with the background characteristics and duty locations of individuals in these jobs. In combat arms, for example, infantrymen are 7.3 percent more likely to leave early than Pershing missile crewmen, but the difference vanishes when we control for other characteristics of individuals in these occupations. According to our model, a recruit's specific job in combat arms has *no* significant influence on his attrition probability.

[10]F-tests are computed for each equation, comparing the unconstrained residual sum of squares (including occupation dummies) with the constrained residual sum of squares (where the occupation parameters are set equal to zero).

[11]In App. C, the level of post-training attrition is predicted by occupational area and specialty, conditional on the individual characteristics, career turbulence, and job assignments of each occupational area. Predictions are also reported by duty location and specialty within each occupational area. The predictions are based on the multivariate attrition equations reported in Tables A.2 and A.3.

V. CONCLUSIONS

In this research, a multivariate model of the attrition process has been developed to begin to describe the effects of individual background characteristics, duty location assignments, career turbulence, and military occupational assignments on post-training attrition. The research suggests that military occupation and duty location are significantly correlated with post-training attrition, after controlling for individual characteristics. The role of career turbulence is unclear; more meaningful measures of turbulence are required than those available at this time. Among individual characteristics, the research demonstrates that high school graduates have much lower post-training attrition rates than nongraduates. The research also indicates that mental test category is not related to attrition after controlling for other background and inservice experience variables. Participation in a delayed entry program (DEP) prior to entering the military tends to reduce substantially the likelihood of attrition. Married recruits are less likely to leave early than single recruits, but the presence of children enhances attrition.

In general, individual characteristics tend to have consistent qualitative and quantitative implications for attrition across occupational groups in the Army and Air Force. Army combat arms are somewhat anomalous, in that individual characteristics such as mental test category and race, which have no influence on attrition in most occupational areas, are significantly correlated with attrition from combat jobs.

These results imply four policy conclusions. First, the similar effects of individual characteristics on attrition in most occupational groups suggest that overall post-training attrition cannot be attenuated by reassigning recruits with certain characteristics to occupations where these characteristics are less positively correlated with attrition. Second, the importance of individual characteristics on post-training attrition indicates that the overall attrition level could be reduced by more stringent accession screens. The costs of meeting current force requirements with more stringent screens may be prohibitively expensive, however; the services would probably have to devote more time, money, and personnel to recruiting, screen more applicants, and offer more generous enlistment incentives. Third, attrition does vary by location, and attrition management may be facilitated by changing personnel practices to reduce the incentives to leave these work environments. Finally, attrition also varies by occupation, and the overall attrition level could be reduced by either altering the mix of military occupations held or enhancing the attractiveness of high-attrition occupations.

These results suggest that it would be useful to conduct more detailed field and survey analysis into attrition-related aspects of certain occupations and locations. Further analysis is needed to identify what factors precipitate unusually high (or low) attrition levels in different locations or occupations. To the extent that attrition differences are related to military programs and facilities, attrition management policies could be designed to replicate desirable factors and reduce overall attrition levels.

Appendix A

DISCRIMINANT RESULTS FOR POST-TRAINING ATTRITION BY OCCUPATIONAL AREA

Table A.1

DEFINITIONS OF DISCRIMINANT VARIABLES

Variable Name	Variable (Indicator) Definition
CDNE	Census Division of Origin--Northeast
CDNC	Census Division of Origin--North Central
CDW	Census Division of Origin--West
CDS*	Census Division of Origin--South and Others, where Others comprises no more than 0.3 percent of cohort
AAELT18	Age at entry less than 18 years
AAE18*	Age at entry 18 years
AAE19	Age at entry 19 years
AAEGT19	Age at entry more than 19 years
NHSG	Not high school graduate
GED	High school graduation equivalence diploma
HSG*	High school graduate
GTHS	Greater than high school education
[illegible]	Black
MENT1	AFQT group I
MENT2*	AFQT group II
MENT3A	AFQT group IIIA

Table A.1—continued

MENT3B&4	AFQT groups IIIB and IV (reported separately for the Army)
MARRIED	Married at end of training
DEPS	Number of dependents more than two
MIDEP0*	Zero months in delayed entry program
MIDEP13	One to three months in delayed entry program
MIDEPGT3	More than three months in delayed entry program
TERM	Four-year term of enlistment (only applies in the Army)
NE1	First duty location after training in Northeast U.S.
NC1	First duty location after training in North Central U.S.
S1*	First duty location after training in Southern U.S.
W1	First duty location after training in Western U.S.
EUR1	First duty location after training in Europe
PAC1	First duty location after training in the Pacific or East Asia
MISS1	First duty location after training missing or unreported
NE2	Last duty location after training in Northeast U.S.
NC2	Last duty location after training in North Central U.S.
S2*	Last duty location after training in Southern U.S.

Table A.1--continued

W2	Last duty location after training in Western U.S.
EUR2	Last duty location after training in Europe or the Canal Zone
PAC2	Last duty location after training in the Pacific or East Asia
MISS2	Last duty location after training missing or unreported
BASDCHA	Variable equals one if active duty base date (the date of expected ETS) changed. Indicator of possible disciplinary action.
DODCHA	Variable equals one if last duty occupation different from occupation of training.
MOSCHA	Variable equals one if last occupation is different from initially trained occupation. In the Army, MOSCHA reflects changes in career fields. In the Air Force, MOSCHA designates a change in AFSC. Designates retrained recruit.

*Omitted category used as reference group.

Table A.2

Discriminant Results on Post-Training Attrition for the Army by Occupational Area

(t-statistics in parentheses)

Variable	Occupational Area				
	Skilled Technicians	Support and Administration	Electrical/Mech Repair	Crafts, Service and Supply	Combat Arms
Constant	-1.2683 (-8.40)*	-1.8006 (-7.73)*	-1.7406 (-8.61)*	-2.33 (5.39)*	-1.6110 (12.33)*
Region of Origin					
CDNE	.1491 (1.16)	.1205 (1.06)	-.0773 (-.84)	-.0753 (-.6538)	.0628 (1.14)
CDNC	.0126 (.11)	.2100 (1.94)	.1269 (1.49)	-.0997 (-.94)	.0965 (1.95)
CDW	.1101 (.84)	.2531 (2.00)*	.0880 (.95)	.1333 (1.10)	.0963 (1.77)
CDS	--	--	--	--	--
Age					
AAELT18	.4897 (3.47)*	.3179 (2.38)*	.3783 (4.08)*	.1158 (.85)	.2460 (4.50)*
AAE18	--	--	--	--	--
AAE19	.0292 (.24)	-.1808 (-1.64)	-.0143 (-.17)	-.2650 (-2.57)*	.0380 (.73)
AAEGT19	-.0575 (-.47)	-.2293 (-2.19)*	-.0390 (-.44)	-.1520 (-1.43)	.0263 (.52)
Education					
NHSG	1.0297 (8.11)*	1.09 (10.70)*	.9837 (13.07)*	1.28 (12.63)*	.9010 (15.14)*
GED	.7941 (4.64)*	.8041 (4.52)*	.6829 (5.16)*	.9400 (5.53)*	.9528 (15.35)*
HSG	--	--	--	--	--
GTHS	-.1028 (-.60)	-.0305 (-.2073)	.0805 (.3893)	-.1923 (-1.06)	-.0287 (-.31)
RACE	-.0874 (-.79)	.1522 (1.71)	-.0847 (-.95)	-.0367 (-.29)	-.2054 (-4.22)*
Mental Scores					
MENT1	-.4208 (-1.68)	-.1342 (-.45)	-.3263 (-1.14)	.2588 (.91)	-.1529 (-1.22)
MENT2	--	--	--	--	--
MENT3A	.0027 (.02)	-.0334 (-.27)	-.2020 (-.0179)	.1152 (1.15)	.1460 (2.88)*
MENT3B	-.0803 (-.68)	.0852 (.74)	.0319 (.37)	.2359 (2.27)*	.1397 (2.88)*
MENT4	.0924 (.34)	-.0497 (-.33)	.1716 (1.38)	.3271 (1.96)*	.1774 (1.93)
Family Status					
MARRIED	-.3303 (-2.38)*	-.2674 (-2.01)*	-.3866 (-3.95)*	-.2540 (-2.20)*	-.1730 (-2.89)*
DEPS	.1283 (.75)	.5301 (3.42)*	.2367 (1.99)*	.0253 (.18)	.1086 (1.53)
Entry					
MIDEP0	--	--	--	--	--
MIDEP13	-.3534 (-3.43)*	-.3011 (-3.50)*	-.2154 (-3.05)*	-.1130 (-1.19)	-.2158 (-5.30)*
MIDEPGT3	-.5877 (-3.86)*	-.4904 (-3.15)*	-.3762 (-3.24)*	-.4666 (-3.69)*	-.5099 (-7.35)*
TERM	.5352 (3.44)*	.8667 (3.88)*	.2476 (2.10)*	.8805 (3.94)*	.3727 (7.25)*

Table A.2—continued

Variable	Occupational Area: Skilled Technicians	Support and Administration	Electrical/Mech Repair	Crafts, Service and Supply	Combat Arms
Duty Location					
NE1	.2741 (.56)	.2623 (.82)	-.1473[a] (-1.00)	.1806 (.76)	-.0366[a] (-.35)
NC1	.1370 (.45)	-.0330 (-.15)	--	-.2522 (-1.53)	--
S1	--	--	--	--	--
W1	.1790 (1.06)	.0995 (.66)	.2904 (2.29)*	-.0802 (-.51)	.2075 2.92)*
EUR1	.2152 (1.78)	.3996 (3.24)*	.1533 (1.66)	.1255 (1.01)	-.1910 (-3.58)*
PAC1	-.4057 (-2.15)*	-.2174 (-1.32)	-.2672 (-1.96)*	-.4393 (-2.75)*	-.3308 (-4.46)*
MISS1	-.3043 (-1.04)	-.0666 (-.31)	.0589 (.3144)	-.3201 (-1.59)	-.2443 (-2.64)*
NE2	-.3107 (-.69)	-.2189 (-.66)	.5541[a] (3.19)*	.3481 (1.33)	.4361[a] (3.89)*
NC2	-.3688 (-1.29)	-.0937 (-.37)	--	.6124 (2.94)*	--
S2	--	--	--	--	--
W2	.07518 (.43)	.1199 (.73)	-.0204 (-.17)	.2800 (1.71)	-.0349 (-.54)
EUR2	-.5610 (-4.86)*	-.7165 (-6.75)*	-.3456 (-3.76)*	-.4033 (-3.61)*	-.0536 (1.03)
PAC2	.2262 (1.06)	.0906 (.54)	-.1768 (-1.302)	.4052 (2.30)*	.3042 (3.58)*
MISS2	-.2410 (-.64)	-.4174 (-1.42)	.3081 (1.23)	-.1361 (-.59)	1.01 (4.94)*
Turbulence					
BASDCHA	.2512 (.96)	.9666 (4.88)*	1.0900 (7.09)*	1.0405 (5.02)*	.8922 (11.33)*
DODCHA	-.5539 (-3.70)*	.1042 (.77)	-.2027 (-1.38)	-1.0471 (-6.36)*	-.0367 (-.52)
MOSCHA	-.3877 (-1.47)	-.3076 (-1.45)	-.3081 (-1.50)	.6359 (2.74)*	-.7186 (-8.84)*
Skilled Technician					
MOS 5C	-1.1158 (-3.54)*	--	--	--	--
MOS 5E	-.7578 (-2.84)*	--	--	--	--
MOS 5F	-.4624 (-2.31)*	--	--	--	--
MOS 11D	--	--	--	--	--
MOS 13E	-.4582 (-2.25)*	--	--	--	--
MOS 17K	-.0263 (-.11)	--	--	--	--
MOS 26L	-.6878 (-2.20)*	--	--	--	--
MOS 31B	-.3631 (-1.62)	--	--	--	--
MOS 31J	-1.0591 (-3.82)*	--	--	--	--
MOS 72C	.3997 (1.11)	--	--	--	--
MOS 72E	-.1841 (-.88)	--	--	--	--

Table A.2—continued

Variable	Occupational Area: Skilled Technicians	Support and Administration	Electrical/Mech Repair	Crafts, Service and Supply	Combat Arms
Skilled Technician (Cont'd)					
MOS 82C	-.1927 (-.77)	--	--	--	--
MOS 91B	-.4156 (-2.41)*	--	--	--	--
Support and Administration					
MOS 71B	--	-.1018 (-.96)	--	--	--
MOS 71M	--	-.1693 (-.54)	--	--	--
MOS 71P	--	-1.0888 (-3.42)*	--	--	--
MOS 73C	--	-.2912 (-1.37)	--	--	--
MOS 75B	--	-.0840 (-.45)	--	--	--
MOS 75D	--	.3386 (1.24)	--	--	--
MOS 75E	--	-.2914 (-.99)	--	--	--
MOS 76D	--	-.2313 (-1.26)	--	--	--
MOS 76P	--	.1015 (.51)	--	--	--
MOS 76Q	--	-.1542 (-.65)	--	--	--
MOS 76S	--	.3262 (1.58)	--	--	--
MOS 76T	--	-.1218 (-.46)	--	--	--
MOS 76U	--	-.1072 (-.42)	--	--	--
MOS 76V	--	-.0474 (.19)	--	--	--
MOS 76Y	--	--	--	--	--
Elect/Mech Repair					
MOS 36C	--	--	-.0605 (-.46)	--	--
MOS 36K	--	--	--	--	--
MOS 45M	--	--	.0829 (.32)	--	--
MOS 52B	--	--	.0475 (.36)	--	--
MOS 55B	--	--	-.0399 (-.19)	--	--
MOS 62B	--	--	-.0311 (-.23)	--	--
MOS 62F	--	--	.3738 (1.33)	--	--
MOS 63B	--	--	-.1463 (-1.31)	--	--
MOS 63C	--	--	-.3446 (-1.85)	--	--

Table A.2—continued

Variable	Occupational Area: Skilled Technicians	Support and Administration	Electrical/Mech Repair	Crafts, Service and Supply	Combat Arms
Elect/Mech Repair (Cont'd)					
MOS 63F	--	--	.0404 (.22)	--	--
MOS 63H	--	--	-.1310 (-.90)	--	--
MOS 67N	--	--	-.2551 (-1.99)*	--	--
MOS 67U	--	--	-.6004 (-2.82)*	--	--
MOS 67V	--	--	-.2079 (-1.02)	--	--
MOS 67Y	--	--	-.5348 (-2.55)*	--	--
Crafts, Services and Supply					
MOS 44B	--	--	--	.9274 (3.27)*	--
MOS 51A	--	--	--	1.1840 (5.31)*	--
MOS 51B	--	--	--	.6571 (3.08)*	--
MOS 51K	--	--	--	.6478 (2.46)*	--
MOS 51R	--	--	--	.1564 (.53)	--
MOS 62J	--	--	--	1.3102 (3.99)*	--
MOS 62M	-	--	--	1.83 (6.75)*	--
MOS 64M	--	--	--	.4595 (4.02)*	--
MOS 76W	--	--	--	.6145 (2.67)*	--
MOS 94B	--	--	--	.9082 (6.61)*	--
MOS 95B	--	--	--	--	--
MOS 95C	--	--	--	0563 (.32)	--
Combat Arms					
MOS 11B	--	--	--	--	--
MOS 11C	--	--	--	--	.0178 (.27)
MOS 11E	--	--	--	--	-.1676 (-2.59)*
MOS 12B	--	--	--	--	-.0578 (-.88)
MOS 13B	--	--	--	--	.0376 (.69)
MOS 15D	--	--	--	--	-.0295 (-.15)
MOS 15E	--	--	--	--	-.2926 (-1.54)
MOS 16D	--	--	--	--	-.0800 (-.56)

Table A.2—continued

Variable	Occupational Area: Skilled Technicians	Support and Administration	Electrical/Mech Repair	Crafts, Service and Supply	Combat Arms
Combat Arms (Cont'd)					
MOS 16E	--	--	--	--	.0112 (.06)
MOS 16P	--	--	--	--	-.0351 (-.34)
MOS 16R	--	--	--	--	-.2141 (-1.50)
MOS 61B	--	--	--	--	-.5333 (-2.24)*
F	7.87	9.17	12.24	15.87	30.40
Sample Size	4123	5031	7167	5450	16789

*Significant at 5 percent.

[a]NE1 and NC1 along with NE2 and NC2 were merged due to small number of observations in separate categories.

Table A.3

Discriminant Results on Post-Training Attrition for the Air Force by Occupational Area

(t-statistics in parentheses)

Variable Name	Occupational Area			
	Skilled Technicians	Support and Administration	Electrical/ Mech. Repair	Crafts, Service and Supply
Constant	-.9078 (-10.70)*	-.3607 (-20.12)*	-.3856 (-22.02)*	.3740 (31.90)*
Region of Origin				
CDNE	.0394 (.61)	.1310 (1.93)	-.1416 (-.24)	.0646 (1.12)
CDNC	-.0274 (-.34)	.1345 (2.12)*	.0678 (1.23)	-.0164 (-.30)
CDW	.0245 (.36)	.1980 (2.66)*	-.1021 -(1.62)	-.0691 (-1.07)
CDS	--	--	--	--
Age				
AAELT18	-.0034 (-.04)	.0900 (1.00)	.1352 (1.44)	.2270 (3.28)*
AAE18	--	--	--	--
AAE19	-.0904 (-1.48)	-.0028 (-.0428	-.1197 (-2.21)*	-1.0148 (-1.01)
AAEGT19	-.0462 (-.78)	-.0808 (-1.30)	-.0795 (-1.44)	-.0398 (-.72)
Education				
NHSG	.6408 (6.42)*	.4796 (4.39)*	.6544 (8.30)*	.7180 (9.05)*
GED	.4836 (3.66)*	.7452 (6.41)*	.5844 (6.78)*	.7682 (8.77)*
HSG	--	--	--	--
GTHS	-.1746 (-1.85)	-.0975 (-1.00)	.1428 (.87)	-.4677 (-3.53)*
RACE	-.8229 (-1.06)	-.1226 (-1.99)*	-.0786 (-1.10)	-.0372 (-.5913)
Mental Scores				
MENT1	-.1030 (-1.17)	-.2341 (-1.78)	-.4247 (-2.76)*	-.0926 (-.54)
MENT2	--	--	--	--
MENT3A	.0586 (.99)	-.0181 (-.30)	-.0239 (-.49)	.0145 (.29)
MENT3B	.1010 (1.19)	-.0685 (-1.09)	-.0152 (-.28)	.0794 (1.50)
Family Status				
MARRIED	-.2199 (-3.73)*	-.2729 (-4.26)*	-.3639 (-6.47)*	-.2634 (-4.59)*
DEPS	.2291 (2.61)*	.2275 (2.64)*	.0948 (1.17)	-.0310 (-.37)
Entry				
MIDEPO	--	--	--	--
MEDEP13	-.0845 (-1.30)	-.1491 (-2.02)*	-.2698 (-4.12)*	-.0729 (-1.17)
MIDEPGT3	-.2500 (-3.25)*	-.3137 (-3.73)*	-.2698 (-7.37)*	-.3804 (-5.46)*

Table A.3—continued

Variable Name	Occupational Area: Skilled Technicians	Support and Administration	Electrical/ Mech. Repair	Crafts, Service and Supply
Duty Location				
NE1	-.1991 (-1.31)	.0174 (.12)	.0854 (.64)	.2142 (1.83)
NC1	.0223 (.22)	-.1411 (-1.41)	-.0170 (-.15)	.1761 (2.12)*
S1	--	--	--	--
W1	.0218 (.26)	.0813 (.99)	.0484 (.69)	.1100 (1.50)
EUR1	.0614 (.60)	-.3806 (-3.67)*	-.1366 (-1.56)	-.2162 (-1.88)
PAC1	-.2432 (-2.03)*	-.1754 (-1.43)	-.1303 (-1.11)	-.3886 (-3.12)*
MISS1	.0721 (.78)	.1116 (1.05)	-.1914 (-2.12)*	.3118 (3.22)*
NE2	-.0128 (-.08)	-.0999 (-.68)	-.0396 (-.29)	-.0489 (-.41)
NC2	.3084 (3.11)*	.4398 (4.19)*	.3442 (3.15)*	.1322 (1.50)
S2	--	--	--	--
W2	.0653 (.81)	-.0504 (-.59)	-.0089 (-.12)	.0667 (.87)
EUR2	-.7012 (-7.91)*	-.8747 (-9.53)*	-.6555 (-8.39)*	-.9858 (-11.49)*
PAC2	-.4090 (-3.94)*	-1.0241 (-10.13)*	-.8310 (-9.43)*	-1.1925 (-12.83)*
MISS2	.3953 (3.40)*	-.0328 (-.26)	1.23 (10.20)*	-.2757 (-2.51)*
Turbulence				
BASDCHA	1.747 (6.53)*	1.5753 (7.27)*	1.73 (9.88)*	1.4009 (8.18)*
DODCHA	.1377 (1.25)	-2.9310 (-21.43)*	.7088 (3.44)*	-1.5483 (-28.32)*
MOSCHA	-.5342 (-3.90)*	1.1745 (5.77)*	-.7730 (-3.44)*	-.0742 (-.74)
Skilled Technicians				
AFSC202	-1.2450 (-5.54)*	--	--	--
AFSC207	-.5358 (-3.12)*	--	--	--
AFSC208	-1.1062 (-5.27)*	--	--	--
AFSC231	.9371 (4.65)*	--	--	--
AFSC251	.5046 (2.96)*	--	--	--
AFSC272	-.5155 (-3.51)*	--	--	--

Table A.3—continued

Variable Name	Occupational Area			
	Skilled Technicians	Support and Administration	Electrical/ Mech. Repair	Crafts, Service and Supply
AFSC274	-.3343 (-1.27)	--	--	--
AFSC276	.3266 (1.86)	--	--	--
AFSC291	.3970 (3.27)*	--	--	--
AFSC293	.2156 (.84)	--	--	--
AFSC303	.1532 (.90)	--	--	--
AFSC304	.2750 (1.94)	--	--	--
AFSC305	-.2617 (-1.15)	--	--	--
AFSC306	.5094 (3.03)*	--	--	--
AFSC307	-.1617 (-.91)	--	--	--
AFSC316	-.3597 (-2.18)*	--	--	--
AFSC321	-.2603 (-1.54)	--	--	--
AFSC325	-.2736 (-1.06)	--	--	--
AFSC326	-.2637 (-1.48)	--	--	--
AFSC328	.1351 (.89)	--	--	--
AFSC341	-.4022 (-1.91)	--	--	--
AFSC463	.2604 (1.31)	--	--	--
AFSC553	.3972 (1.54)	--	--	--
AFSC571	--	--	--	--
AFSC902	.7378 (.49)	--	--	--
AFSC903	.0378 (.15)	--	--	--
AFSC904	-.2933 (-1.44)	--	--	--
AFSC981	.5272 (2.74)*	--	--	--
Support and Administration				
AFSC271	--	2.29 (13.08)*	--	--
AFSC511	--	-.8584 (-7.59)*	--	--
AFSC602	--	2.17 (11.44)*	--	--

Table A.3—continued

Variable Name	Occupational Area			
	Skilled Technicians	Support and Administration	Electrical/ Mech. Repair	Crafts, Service and Supply
AFSC605	--	2.1317 (15.53)*	--	--
AFSC645	--	.2647 (4.36)*	--	--
AFSC672	--	-.3206 (-3.29)*	--	--
AFSC701	--	.1426 (.70)	--	--
AFSC702	--	--	--	--
AFSC732	--	.0171 (.17)	--	--
AFSC741	--	-.0582 (-.31)	--	--
AFSC906	--	-.0742 (-.48)	--	--
Electrical/Mech. Repair				
AFSC361	--	--	.0814 (.51)	--
AFSC362	--	--	-.2697 (-2.0)	--
AFSC423	--	--	-.1084 (-2.64)*	--
AFSC426	--	--	.0907 (1.21)	--
AFSC431	--	--	--	--
AFSC443	--	--	-.3653 (-2.44)*	--
AFSC461	--	--	-.0847 (-1.02)	--
AFSC462	--	--	-.1963 (-2.80)*	--
AFSC472	--	--	.3250 (3.69)*	--
AFSC541	--	--	-.1743 (-.95)	--
AFSC542	--	--	-.0983 (-1.18)	--
Crafts, Service and Supply				
AFSC427	--	--	--	-.5890 (-7.81)*
AFSC545	--	--	--	-.6488 (-4.71)*
AFSC547	--	--	--	-.8194 (-6.48)*
AFSC552	--	--	--	-.7878 (-8.83)*
AFSC566	--	--	--	-.7810 (-5.31)*
AFSC603	--	--	--	-.7440 (-10.25)*

Table A.3—continued

Variable Name	Occupational Area			
	Skilled Technicians	Support and Administration	Electrical/ Mech. Repair	Crafts, Service and Supply
AFSC611	--	--	--	-.6130 (-2.90)*
AFSC622	--	--	--	-.6706 (-6.53)*
AFSC631	--	--	--	-.8839 (-10.77)*
AFSC811	--	--	--	--
AFSC915	--	--	--	.4529 (2.32)*
AFSC922	--	--	--	-.9760 (-6.54)*
F	10.69	28.90	21.85	41.36
Sample Size	11011	9106	12211	12172

*Significant at 5 percent.

Appendix B

1975 ACCESSION COHORT ATTRITION RATES BY STATE OR NATIONAL ASSIGNMENT

Table B.1

ATTRITION RATES BY INITIAL POST-TRAINING CONUS LOCATION ASSIGNMENTS IN THE ARMY

State	% Attrition	% Cohort
Alabama	10.8	1.3
Arizona	16.2	0.5
California	23.7	3.8
Colorado	23.7	4.4
Dist. of Columbia	8.1	0.1
Florida	20.4	0.9
Georgia	18.1	5.2
Illinois	2.2	0.1
Indiana	18.2	0.2
Kansas	20.9	2.7
Kentucky	26.3	6.3
Louisiana	27.2	1.3
Maryland	18.7	0.9
Massachusetts	16.4	0.7
Mississippi	22.2	0.1
Missouri	21.3	2.4
New Jersey	32.0	0.6
New Mexico	10.0	0.1
New York	12.4	0.2
North Carolina	18.0	6.3
Ohio	0.0	0.0
Oklahoma	24.4	5.0
Pennsylvania	14.3	0.0
South Carolina	25.7	0.6
Texas	21.8	11.6
Utah	25.0	0.0
Virginia	14.5	4.3
Washington	27.3	5.5
West Virginia	100.0	0.0
Wisconsin	22.8	0.3
Missing values	18.2	4.2
Total	21.5	69.6

Table B.2

Attrition Rates by Initial Post-Training Non-CONUS Location Assignments in the Army

State/Country	% Attrition	% Cohort
Alaska	24.8	1.4
Belgium	0.0	0.0
Canal Zone	25.1	0.8
China, Republic	33.3	0.0
Germany, Federal	20.0	19.7
Greece	20.2	0.4
Hawaii	18.7	2.8
Italy	12.5	0.3
Japan	5.9	0.1
Johnston Atoll	12.5	0.0
Korea, Republic	16.1	4.4
Netherlands	0.0	0.0
Germany, Berlin	13.1	0.5
Puerto Rico	0.0	0.0
Turkey	5.9	0.0
Total	19.4	30.4

Table B.3

Attrition Rates by Final Post-Training CONUS Location Assignments in the Army

State	% Attrition	% Cohort
Alabama	10.3	0.7
Arizona	16.7	0.6
Arkansas	0.0	0.0
California	24.4	4.0
Colorado	22.9	5.0
Dist. of Columbia	30.9	0.3
Florida	16.5	1.1
Georgia	19.1	5.6
Illinois	9.3	0.1
Indiana	24.3	0.1
Iowa	0.0	0.0
Kansas	21.8	2.5
Kentucky	28.6	6.6
Louisiana	21.4	1.9
Maine	0.0	0.0
Maryland	18.4	1.1
Massachusetts	18.2	0.7
Michigan	0.0	0.0
Minnesota	0.0	0.0
Mississippi	30.6	0.1
Missouri	34.5	0.8
Nebraska	0.0	0.0
New Hampshire	0.0	0.0
New Jersey	36.3	0.7
New Mexico	11.0	0.2
New York	8.6	0.2
North Carolina	17.8	6.7
Ohio	0.0	0.0
Oklahoma	28.1	3.0
Pennsylvania	6.3	0.0
South Carolina	31.6	0.3
Tennessee	0.0	0.0
Texas	21.3	11.6
Utah	11.1	0.0
Virginia	14.1	2.1
Washington	27.8	5.7
West Virginia	50.0	0.0
Wisconsin	22.4	0.3
Missing values	22.8	1.6
Total	22.5	63.4

Table B.4

Attrition Rates by Final Post-Training Non-CONUS Location Assignments in the Army

State/Country	% Attrition	% Cohort
Alaska	24.5	1.4
Australia	0.0	0.0
Belgium	0.0	0.0
Canal Zone	29.8	0.7
China, Republic	100.0	0.0
Germany, Federal	17.2	27.1
Germany, East	0.0	0.0
Greece	16.2	0.6
Guam	16.7	0.0
Hawaii	17.3	2.9
Iran	0.0	0.0
Italy	10.1	0.5
Japan	6.8	0.1
Johnston Atoll	0.0	0.0
Korea, Republic	24.1	2.5
Netherlands	0.0	0.0
Germany, Berlin	11.3	0.6
Portugal	0.0	0.0
Puerto Rico	0.0	0.0
Saudi Arabia	0.0	0.0
Turkey	11.1	0.0
Total	17.9	36.6

Table B.5

Attrition Rates by Initial Post-Training CONUS Location Assignments in the Air Force

State	% Attrition	% Cohort
Alabama	25.6	0.8
Arizona	34.2	3.5
Arkansas	32.9	2.5
California	36.0	10.5
Colorado	28.7	1.1
Delaware	32.3	1.3
Dist. of Columbia	29.3	0.3
Florida	28.6	6.3
Georgia	28.7	1.3
Idaho	33.8	1.4
Illinois	27.8	1.3
Indiana	34.3	0.7
Kansas	38.1	1.1
Kentucky	38.5	0.1
Louisiana	33.9	1.9
Maine	41.1	1.1
Maryland	29.3	0.8
Massachusetts	31.7	0.2
Michigan	34.2	2.1
Minnesota	33.7	0.4
Mississippi	31.2	1.5
Missouri	38.9	1.1
Montana	32.8	1.4
Nebraska	32.3	1.8
Nevada	25.5	2.1
New Hampshire	32.1	1.1
New Jersey	30.6	1.0
New Mexico	28.2	3.3
New York	31.1	2.4
North Carolina	34.7	2.2
North Dakota	42.2	3.2
Ohio	33.9	1.?
Oklahoma	36.5	1.6
Oregon	31.4	0.2
South Carolina	31.3	3.0
South Dakota	42.1	1.5
Texas	32.7	8.5
Utah	24.5	0.9
Vermont	20.0	0.0
Virginia	32.4	1.4
Washington	37.9	2.1
Wisconsin	14.3	0.0
Wyoming	41.7	1.2
Missing values	31.2	9.0
Total	33.0	90.4

Table B.6

Attrition Rates by Initial Post-Training Non-CONUS Location Assignments in the Air Force

State/Country	% Attrition	% Cohort
Alaska	32.1	0.9
Belgium	37.5	0.0
Canal Zone	17.7	0.1
China, Republic	30.8	0.0
Germany, Federal	24.8	2.5
Greece	28.0	0.1
Greenland	0.0	0.0
Guam	25.3	0.6
Hawaii	30.4	0.2
Iceland	19.2	0.1
Iran	50.0	0.0
Italy	35.3	0.2
Japan	23.0	1.0
Johnston Atoll	0.0	0.0
Korea, Republic	20.0	0.4
Malaysia	0.0	0.0
Netherlands	20.5	0.1
Germany, Berlin	33.3	0.0
Norway	0.0	0.0
Philippines	21.5	0.7
Portugal	18.2	0.1
Spain	23.6	0.5
St. Helena	0.0	0.0
Turkey	27.7	0.4
United Kingdom	28.5	1.9
Total	25.8	9.8

Table B.7

ATTRITION RATES BY FINAL POST-TRAINING CONUS LOCATION ASSIGNMENTS IN THE AIR FORCE

State	% Attrition	% Cohort
Alabama	35.2	0.4
Arizona	35.3	3.3
Arkansas	36.6	2.2
California	36.6	10.6
Colorado	24.6	1.6
Delaware	32.3	1.2
Dist. of Columbia	28.5	0.3
Florida	28.7	6.0
Georgia	29.0	1.4
Idaho	37.4	1.3
Illinois	34.9	1.4
Indiana	35.1	0.7
Kansas	40.6	1.0
Kentucky	48.6	0.1
Louisiana	32.7	2.0
Maine	43.4	1.0
Maryland	28.4	0.9
Massachusetts	30.4	0.3
Michigan	37.6	1.8
Minnesota	37.3	0.3
Mississippi	31.4	1.9
Missouri	46.6	1.0
Montana	40.5	1.2
Nebraska	33.5	1.8
Nevada	28.6	1.8
New Hampshire	34.3	1.0
New Jersey	32.0	1.0
New Mexico	33.0	2.9
New York	31.0	2.5
North Carolina	38.3	2.0
North Dakota	48.6	2.8
Ohio	32.0	1.3
Oklahoma	37.4	1.6
Oregon	35.7	0.2
South Carolina	32.4	2.8
South Dakota	45.6	1.4
Texas	38.7	7.5
Utah	29.6	0.7
Virginia	32.4	1.5
Washington	39.5	2.0
Wyoming	48.2	1.0
Missing values	34.3	5.5
Total	35.4	83.2

Table B.8

Attrition Rates by Final Post-Training Non-CONUS Location Assignments in the Air Force

State/Country	% Attrition	% Cohort
Alaska	35.3	1.6
Belgium	12.1	0.1
Canal Zone	9.3	0.3
China, Republic	10.0	0.0
Germany, Federal	15.5	4.7
Greece	12.1	0.2
Greenland	11.1	0.0
Guam	19.2	0.7
Hawaii	18.9	0.6
Iceland	27.7	0.1
Italy	18.9	0.4
Japan	13.8	1.8
Korea, Republic	13.4	1.1
Netherlands	21.3	0.1
Germany, Berlin	12.5	0.0
Norway	0.0	0.0
Philippines	10.9	1.3
Portugal	14.3	0.1
Spain	18.7	0.7
Turkey	26.5	0.4
United Kingdom	19.9	2.7
Total	17.3	16.8

Appendix C

ATTRITION PREDICTIONS FROM MULTIVARIATE ATTRITION MODEL

Table C.1

PREDICTED PROBABILITY OF ARMY POST-TRAINING ATTRITION BY FIRST DUTY LOCATION AND OCCUPATIONAL AREA

	Location						
Occupational Area	NE1	NC1	S1	W1	EUR1	PAC1	Total
Skilled Technicians	17.5	15.6	13.9	16.2	16.7	9.7	14.5
Functional Support and Administration	17.8	13.9	14.3	15.5	20.0	11.8	15.1
Electrical/Mechanical Equipment Repair	14.9	(a)	16.9	21.4	19.3	13.5	17.6
Craftsmen, Service, and Supply Handlers	17.5	12.1	15.0	14.0	16.7	10.2	14.3
Combat Arms	28.5	(a)	25.9	29.4	22.7	21.5	24.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.2

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Occupational Area

Occupational Area	Location						
	NE2	NC2	S2	W2	EUR2	PAC2	Total
Skilled Technicians	13.2	12.6	17.2	18.3	10.6	20.7	14.5
Functional Support and Administration	15.4	17.1	18.4	20.3	10.9	9.9	15.1
Electrical/Mechanical Equipment Repair	28.9	(a)	18.9	16.0	14.2	16.3	17.6
Craftsmen, Service, and Supply Handlers	19.4	23.9	14.5	18.4	10.2	20.3	14.3
Combat Arms	32.7	(a)	23.9	23.3	24.9	29.9	24.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.3

Predicted Probability of Army Post-Training Attrition by Military Occupational Specialty in the Skilled Technician Area

Occupation	Code	% Attrition
Radio Teletype Oper.	5C	7.2
Voice-Radio Oper.	5E	9.9
Radio Teletype (Non-Morse)	5F	12.9
Cannon Fire Direction Spec.	13E	13.0
Ground Surv. Radar Crew	17K	18.7
Tact Microwave Repairer	26L	10.6
Field Comm-Electronics Mech.	31B	14.1
Teletypewriter	31J	7.5
Central Office Switchbd Oper.	72C	26.0
Telecomm. Center Oper.	72E	16.4
Cartographer	82C	16.3
Medical Spec.	91B	13.4
Total		14.5

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.4

Predicted Probability of Army Post-Training Attrition by Military Occupational Specialty in the Functional Support and Administration Area

Occupation	Code	% Attrition
Clerk Typist	71B	14.7
Chapel Activities Spec.	71M	13.9
Flight Oper. Coordinator	71P	6.0
Finance Spec.	73C	12.5
Personnel Admin. Spec.	75B	14.9
Personnel Records Spec.	75D	21.1
Personnel Actions Spec.	75E	12.5
Material Supply Spec.	76D	13.2
Stock Control Spec.	76P	17.4
Special Purpose Supply Spec.	76Q	14.1
Vehicle Materiel Supply Spec.	76S	20.9
Aircraft Materiel Supply Spec.	76T	14.5
Commel Materiel Supply Spec.	76U	14.6
Storage Spec.	76V	16.7
Unit Supply Spec.	76Y	16.0
Total		15.1

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.5

Predicted Probability of Army Post-Training Attrition by Military Occupational Specialty in the Electrical/Mechanical Equipment Repair Area

Occupation	Code	% Attrition
Wire Systems Installer/Oper.	36C	18.1
Tactical Wire Oper. Spec.	36K	19.0
Aircraft Subsystems Mechanic	45M	20.3
Power gen. Oper/Mechanic	52B	19.8
Ammunition Spec.	55B	18.4
Construction Equipment Repairer	62B	18.6
Lifting/Loading Equipment Oper.	62F	25.5
Gen & Wheeled Vehicle Mech.	63B	16.9
Track Vehicle Mechanic	63C	14.3
Recovery Spec.	63F	19.7
Automotive Repairman	63H	17.1
Utility Helicopter Repairer	67N	15.4
Medium Helicopter Repairer	67U	11.4
Observation Helicopter Repairer	67V	16.0
Attack Helicopter Repairer	67Y	12.1
Total		17.6

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.6

Predicted Probability of Army Post-Training Attrition by Military Occupational Specialty in the Craftsmen, Service, and Supply Handlers Area

Occupation	Code	% Attrition
Metal Worker	44B	20 5
Construction & Util. Worker	51A	25.0
Carpentry & Masonry Spec.	51B	16.4
Plumber	51K	16.3
Electrician	51R	10.6
Construction Equipment Oper.	62J	27.4
Rough Ter. Lifter/Loader Oper.	62M	38.8
Motor Transport Oper.	64M	13.9
Petroleum Supply Spec.	76W	15.9
Food Service Spec.	94B	20.2
Military Police	95B	9.2
Correctional Spec.	95C	9.7
Total		14.3

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.7

Predicted Probability of Army Post-Training Attrition by Military Occupational Specialty in the Combat Arms Area

Occupation	Code	% Attrition
Infantryman	11B	25.4
Indirect Fire Infantryman	11C	25.7
Armor Crew	11E	22.3
Combat Engineer	12B	24.3
Cannon Crew	13B	26.1
Lance Missile Crew	15D	24.8
Pershing Missile Crew	15E	20.2
Hawk Missile Crew	16D	23.9
Hawk Missile Fire Control	16E	25.6
ADA Short Range Missile Crew	16P	24.7
ADA Short Range Gun Crew	16R	21.5
Watercraft Oper.	61B	16.6
Total		24.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.8

Predicted Probability of Army Post-Training Attrition by First Duty Location and Military Occupational Specialty in the Skilled Technician Area

	Location						
MOS	NE1	NC1	S1	W1	EUR1	PAC1	Total
5C	8.8	7.8	6.8	8.1	8.4	4.7	5.1
5E	12.1	10.8	9.5	11.2	11.5	6.5	7.2
5F	15.7	13.9	12.4	14.5	14.9	8.6	9.4
11D	22.8	20.5	18.3	21.1	21.8	13.0	14.2
13E	15.7	14.0	12.4	14.5	15.0	8.6	9.5
17K	22.3	20.0	17.9	20.7	21.3	12.7	13.9
26L	12.9	11.4	10.1	11.9	12.3	7.0	7.7
31B	17.0	15.2	13.5	15.7	16.2	9.4	10.3
31J	9.3	8.2	7.2	8.5	8.8	4.9	5.4
72C	30.6	27.7	25.1	28.6	29.3	18.2	19.8
72E	19.7	17.6	15.7	18.2	18.8	11.1	12.1
82C	19.6	17.5	15.6	18.1	18.7	11.0	12.0
91B	16.3	14.5	12.9	15.0	15.5	9.0	9.8
Total	17.5	15.6	13.9	16.2	16.7	9.7	14.5

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.9

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Military Occupational Specialty in the Skilled Technician Area

	Location						
MOS	NE2	NC2	S2	W2	EUR2	PAC2	Total
5C	6.5	6.2	8.7	9.3	5.1	10.6	6.9
5E	9.1	8.6	12.0	12.8	7.2	14.5	9.6
5F	11.8	11.2	15.4	16.4	9.4	18.6	12.5
11D	17.5	16.7	22.5	23.8	14.2	26.6	18.5
13E	11.8	11.2	15.5	16.5	9.5	18.7	12.6
17K	17.1	16.3	22.0	23.3	13.9	26.1	18.2
26L	9.6	9.1	12.7	13.6	7.7	15.4	10.3
31B	12.9	12.2	16.8	17.8	10.3	20.2	13.7
31J	6.9	6.5	9.1	9.8	5.4	11.2	7.3
72C	24.1	23.0	30.2	31.8	19.8	35.1	25.3
72E	15.0	14.3	19.4	20.6	12.1	23.2	15.9
82C	14.9	14.2	19.3	20.5	12.0	23.1	15.8
91B	12.3	11.7	16.1	17.1	9.8	19.3	13.1
Total	13.2	12.6	17.2	18.3	10.6	20.7	14.5

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.10

Predicted Probability of Army Post-Training Attrition by First Duty Location and Military Occupational Specialty in the Functional Support and Administration Area

	Location						
MOS	NE1	NC1	S1	W1	EUR1	PAC1	Total
71B	17.3	13.5	13.9	15.1	19.4	11.5	13.1
71M	16.4	12.7	13.1	14.3	18.4	10.8	12.4
71P	7.2	5.5	5.7	6.2	8.2	4.6	5.3
73C	14.8	11.4	11.8	12.8	16.6	9.7	11.1
75B	17.6	13.7	14.1	15.4	19.7	11.7	13.3
75D	24.6	19.5	20.0	21.7	27.2	16.8	19.0
75E	14.8	11.4	11.8	12.8	16.6	9.7	11.1
76D	15.6	12.1	12.4	13.5	17.4	10.2	11.7
76P	20.4	16.1	16.5	17.9	22.8	13.7	15.6
76Q	16.6	12.9	13.3	14.5	18.6	11.0	12.5
76S	24.3	19.3	19.8	21.5	27.0	16.6	18.8
76T	17.0	13.3	13.7	14.9	19.1	11.3	12.9
76U	17.3	13.4	13.8	15.1	19.3	11.4	13.1
76V	19.6	15.3	15.8	17.1	21.8	13.1	14.9
76Y	18.8	14.7	15.2	16.5	21.0	12.6	14.3
Total	17.8	13.9	14.3	15.5	20.0	11.8	15.1

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.11

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Military Occupational Specialty in the Functional Support and Administration Area

	Location						
MOS	NE2	NC2	S2	W2	EUR2	PAC2	Total
71B	15.0	16.6	18.0	19.8	9.7	19.3	12.6
71M	14.1	15.7	17.0	18.7	9.1	18.3	11.9
71P	6.1	6.9	7.5	8.4	3.8	8.2	5.1
73C	12.7	14.2	15.3	17.0	8.1	16.5	10.7
75B	15.2	16.9	18.2	20.1	9.8	19.6	12.8
75D	21.4	23.6	25.4	27.7	14.2	27.1	18.3
75E	12.7	14.1	15.3	16.9	8.1	16.5	10.7
76D	13.4	14.9	16.1	17.8	8.6	17.4	11.2
76P	17.7	19.6	21.1	23.2	11.6	22.7	15.0
76Q	14.3	15.9	17.2	19.0	9.2	18.5	12.0
76S	21.2	23.4	25.1	27.5	14.1	26.9	18.1
76T	14.7	16.3	17.7	19.5	9.5	19.0	12.4
76U	14.9	16.5	17.9	19.7	9.6	19.2	12.5
76V	16.9	18.8	20.3	22.3	11.0	21.8	14.3
76Y	16.3	18.1	19.5	21.5	10.6	21.0	13.8
Total	15.4	17.1	18.4	20.3	10.9	9.9	15.1

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.12

Predicted Probability of Army Post-Training Attrition by First Duty Location and Military Occupational Specialty in the Electrical/Mechanical Equipment Repair Area

	Location						
MOS	NE1	NC1[a]	S1	W1	EUR1	PAC1	Total
36C	15.4	**	17.4	22.0	19.9	13.9	18.3
36K	16.2	**	18.3	23.1	20.9	14.6	19.2
45M	17.4	**	19.6	24.6	22.3	15.7	20.5
52B	16.9	**	19.0	23.9	21.7	15.3	20.0
55B	15.7	**	17.7	22.4	20.2	14.2	18.6
62B	15.8	**	17.9	22.5	20.4	14.3	18.7
62F	21.9	**	24.6	30.3	27.7	20.0	25.7
63B	14.3	**	16.2	20.6	18.6	12.9	17.0
63C	12.1	**	13.7	17.5	15.8	10.8	14.4
63F	16.8	**	18.9	23.8	21.6	15.2	19.8
63H	14.5	**	16.4	20.8	18.8	13.1	17.3
67N	13.0	**	14.8	18.8	17.0	11.7	15.6
67U	9.6	**	11.0	14.1	12.6	8.6	11.5
67V	13.6	**	15.4	19.6	17.7	12.2	16.2
67Y	10.2	**	11.6	14.9	13.4	9.1	12.2
Total	14.9	**	16.9	21.4	19.3	13.5	17.6

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.13

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Military Occupational Specialty in the Electrical/Mechanical Equipment Repair Area

	Location						
MOS	NE2	NC2[a]	S2	W2	EUR2	PAC2	Total
36C	29.7	**	19.5	19.2	14.6	16.9	24.8
36K	30.9	**	20.5	20.1	15.4	17.7	25.9
45M	32.7	**	21.8	21.5	16.5	19.0	27.6
52B	32.0	**	21.3	20.9	16.0	18.4	26.9
55B	30.1	**	19.8	19.5	14.9	17.2	25.2
62B	30.3	**	20.0	19.6	15.0	17.3	25.3
62F	39.4	**	27.2	26.8	20.9	23.9	33.7
63B	27.9	**	18.2	17.9	13.6	15.7	23.2
63C	24.1	**	15.4	15.2	11.4	13.3	19.9
63F	31.8	**	21.1	20.8	15.9	18.3	26.7
63H	28.2	**	18.4	18.1	13.8	15.9	23.5
67N	25.8	**	16.6	16.3	12.4	14.3	21.3
67U	19.7	**	12.4	12.2	9.1	10.6	16.1
67V	26.7	**	17.3	17.0	12.9	14.9	22.1
67Y	20.8	**	13.1	12.9	9.6	11.2	17.0
Total	28.9	**	18.9	16.0	14.2	16.3	17.6

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.14

Predicted Probability of Army Post-Training Attrition by First Duty Location and Military Occupational Specialty in the Craftsmen, Service, and Supply Handlers Area

	Location						
MOS	NE1	NC1	S1	W1	EUR1	PAC1	Total
44B	24.7	17.5	21.5	20.1	23.6	15.0	16.5
51A	29.7	21.5	26.1	24.6	28.6	18.5	20.4
51B	20.0	13.9	17.2	16.1	19.1	11.8	13.1
51K	19.8	13.8	17.1	16.0	19.0	11.7	13.0
51R	13.1	8.9	11.2	10.4	12.5	7.5	8.4
62J	32.4	23.7	28.6	27.0	31.2	20.5	22.5
62M	44.6	34.3	40.2	38.3	43.3	30.2	32.8
64M	17.0	11.7	14.6	13.6	16.2	9.9	11.0
76W	19.3	13.4	16.6	15.6	18.5	11.4	12.7
94B	24.3	17.2	21.1	19.8	23.3	14.7	16.3
95B	11.5	7.7	9.8	9.1	10.9	6.5	7.3
95C	12.0	8.2	10.3	9.5	11.5	6.9	7.7
Total	17.5	12.1	15.0	14.0	16.7	10.2	14.3

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in in the occupational area.

Table C.15

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Military Occupational Specialty in the Craftsmen, Service, and Supply Handlers Area

	Location						
MOS	NE2	NC2	S2	W2	EUR2	PAC2	Total
44B	27.2	32.7	20.8	25.8	15.0	28.3	18.7
51A	32.5	38.6	25.4	31.0	18.5	33.8	22.9
51B	22.2	27.0	16.7	21.0	11.8	23.2	14.9
51K	22.0	26.9	16.6	20.8	11.7	23.0	14.8
51R	14.7	18.3	10.9	13.9	7.5	15.4	9.6
62J	35.4	41.6	27.9	33.8	20.5	36.7	25.2
62M	47.9	54.5	39.3	46.2	30.2	49.3	36.1
64M	18.9	23.3	14.2	17.9	9.9	19.8	12.6
76W	21.4	26.2	16.1	20.3	11.4	22.4	14.4
94B	26.8	32.3	20.5	25.5	14.7	27.9	18.4
95B	12.9	16.1	9.4	12.1	6.5	13.5	8.3
95C	13.5	16.9	9.9	12.7	6.9	14.2	8.8
Total	19.4	23.9	14.5	18.4	10.2	20.3	14.3

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.16

Predicted Probability of Army Post-Training Attrition by First Duty Location and Military Occupational Specialty in the Combat Arms Area

	Location						
MOS	NE1	NC1[a]	S1	W1	EUR1	PAC1	Total
11B	25.7	**	26.4	30.6	22.9	20.5	22.0
11C	26.1	**	26.8	31.0	23.2	20.8	22.3
11E	22.6	**	23.3	27.2	20.1	17.9	19.2
12B	24.6	**	25.3	29.4	21.9	19.6	21.0
13B	26.4	**	27.2	31.5	23.5	21.1	22.6
15D	25.2	**	25.9	30.0	22.4	20.0	21.5
15E	20.5	**	21.1	24.8	18.1	16.1	17.3
16D	24.2	**	24.9	29.0	21.5	19.2	20.6
16E	25.9	**	26.6	30.9	23.1	20.7	22.1
16P	25.1	**	25.7	29.9	22.3	19.9	21.4
16R	21.8	**	22.5	26.3	19.3	17.2	18.5
61B	16.9	**	17.4	20.6	14.8	13.1	14.2
Total	28.5	**	25.9	29.4	22.7	21.5	24.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.17

Predicted Probability of Army Post-Training Attrition by Last Duty Location and Military Occupational Specialty in the Combat Arms Area

	Location						
MOS	NE2	NC2[a]	S2	W2	EUR2	PAC2	Total
11B	33.3	**	24.4	23.8	25.4	30.5	47.1
11C	33.7	**	24.8	24.1	25.8	30.8	47.6
11E	29.7	**	21.5	20.9	22.4	27.0	43.0
12B	32.1	**	23.4	22.8	24.3	29.3	45.7
13B	34.2	**	25.1	24.5	26.1	31.3	48.1
15D	32.7	**	23.9	23.3	24.9	29.8	46.4
15E	27.2	**	19.4	18.9	20.3	24.6	39.9
16D	31.6	**	23.0	22.4	23.9	28.8	45.1
16E	33.6	**	24.6	24.0	25.6	30.7	47.4
16P	32.5	**	23.8	23.2	24.8	29.7	46.2
16R	28.7	**	20.7	20.1	21.6	26.1	41.8
61B	22.7	**	15.9	15.5	16.7	20.4	34.3
Total	32.7	**	23.9	23.3	24.9	29.9	24.8

[a]NE1 and NC1 were merged because of the small number of observations in the separate categories.

Table C.18

Predicted Probability of Air Force Post-Training Attrition by First Duty Location and Occupational Area

	Location						
Occupational Area	NE1	NC1	S1	W1	EUR1	PAC1	Total
Skilled Technicians	21.8	25.8	25.4	25.8	26.6	21.1	25.4
Functional Support and Administration	34.8	31.3	34.4	36.3	26.4	30.6	33.8
Electrical/Mechanical Equipment Repair	31.8	29.6	29.9	31.0	27.2	27.3	29.7
Craftsmen, Service, and Supply Handlers	37.7	36.8	32.9	35.3	28.3	24.9	34.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.19

Predicted Probability of Air Force Post-Training Attrition by Last Duty Location and Occupational Area

	Location						
Occupational Area	NE2	NC2	S2	W2	EUR2	PAC2	Total
Skilled Technicians	25.3	31.8	25.5	26.8	14.5	18.5	25.4
Functional Support and Administration	34.2	47.1	36.5	35.3	19.3	17.1	33.8
Electrical/Mechanical Equipment Repair	30.1	38.7	30.9	30.8	18.9	16.3	29.7
Craftsmen, Service, and Supply Handlers	36.8	41.1	37.9	39.5	18.6	15.6	34.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.20

Predicted Probability of Air Force Post-Training Attrition by Military Occupational Specialty in the Skilled Technician Area

Occupation	Code	% Attrition
Radio Comm Analysis/Security	202	9.0
Comm Collection/Systems	207	16.8
Voice Processing	208	10.2
Audiovisual Services	231	46.8
Weather	251	36.3
Air Traffic	272	17.1
Command and Control	274	19.8
Aerospace Control/Warning Sys	276	32.3
Telecommunications Operations	291	33.9
Radio Operations	293	29.9
Ground Radar	303	28.6
Ground Radio Communications	304	31.2
Electronic Computer Sys Maint	305	21.0
Elect/Elect-Mech Comm & Cryp Eqp	306	36.4
Tele-Comm Sys Control	307	22.7
Missile Electronic Maintenance	316	19.4
Avionic Weapon Delivery Systems	321	21.0
Auto Flight Con/Avionics Instr	325	20.8
Integrated Avionics	326	20.9
Avionic Comm-Navigations Sys	328	28.3
Training Devices	341	18.7
Nuclear Weapons	463	30.9
Site Development	553	33.9
Fire Protection	571	25.6
Medical Service	902	27.1
Radiologic	903	26.3
Medical Laboratory	904	20.4
Dental Technician	981	36.9
Total		25.4

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.21

Predicted Probability of Air Force Post-Training Attrition by Military Occupational Specialty in the Functional Support and Administration Area

Occupation	Code	% Attrition
Air Operations	271	79.4
Computer Systems	511	14.2
Traffic Management	602	77.2
Air Transportation	605	76.6
Supply Management	645	33.6
Accounting and Finance	672	22.0
Chapel Management	701	31.0
Administration	702	28.0
Personnel	732	28.4
Recreation Services	741	26.9
Medical Administrative	906	26.5
Total		33.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.22

Predicted Probability of Air Force Post-Training Attrition by Military Occupational Specialty in the Electrical/Mechanical Equipment Repair Area

Occupation	Code	% Attrition
Outside Wire Installation/Maint	361	32.5
Telephone Plant Maint	362	25.3
Aircraft Accessory Sys	423	27.3
Aircraft Propulsion	426	32.7
Aircraft Maintenance	431	30.7
Missile Maintenance	443	23.5
Munitions Maintenance	461	29.0
Weapons Maintenance	462	26.7
Vehicle Maintenance	472	38.0
Missile Facilities	541	27.2
Electrical	542	28.7
Total		29.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.23

Predicted Probability of Air Force Post-Training Attrition by Military Occupational Specialty in the Craftsmen, Service, and Supply Handlers Area

Occupation	Code	% Attrition
Metalworking	427	30.0
Ref & Air Conditioning	545	28.7
Mechanical	547	25.4
Structural	552	26.0
Sanitation	566	26.1
Vehicle Operations	603	26.8
Supply Services	611	29.5
Food Service	622	28.3
Fuel	631	24.2
Security Police	811	43.5
Medical Material	915	54.8
Aircrew Life Support	922	22.5
Total		34.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.24

Predicted Probability of Air Force Post-Training Attrition by First Duty Location and Air Force Specialty in the Skilled Technician Area

	Location						
AFSC	'E1	NC1	S1	W1	EUR1	PAC1	Total
202	7.5	9.2	9.0	9.2	9.5	7.2	9.0
207	14.2	17.1	16.8	17.1	17.6	13.6	16.8
208	8.5	10.4	10.2	10.4	10.8	8.2	10.2
231	41.8	47.3	46.7	47.3	48.3	40.8	46.8
251	31.8	36.8	36.3	36.8	37.7	30.9	36.3
272	14.4	17.4	17.0	17.3	17.9	13.9	17.1
274	16.8	20.1	19.8	20.1	20.7	16.2	19.8
276	28.1	32.8	32.3	32.8	33.6	27.2	32.3
291	29.5	34.3	33.8	34.3	35.2	28.6	33.9
293	25.9	30.4	29.9	30.4	31.2	25.1	29.9
303	24.7	29.1	28.6	29.1	29.9	23.9	28.6
304	27.1	31.7	31.2	31.6	32.5	26.2	31.2
305	17.8	21.3	20.9	21.3	22.0	17.2	21.0
306	31.9	36.9	36.4	36.9	37.8	31.0	36.4
307	19.3	23.0	22.6	23.0	23.7	18.7	22.7
316	16.4	19.7	19.4	19.7	20.3	15.8	19.4
321	17.8	21.3	21.0	21.3	22.0	17.2	21.0
325	17.6	21.1	20.7	21.1	21.8	17.0	20.8
326	17.8	21.3	20.9	21.3	21.9	17.2	20.9
328	24.4	28.7	28.2	28.7	29.5	23.6	28.3
341	15.9	19.0	18.7	19.0	19.6	15.3	18.7
463	26.8	31.3	30.8	31.3	32.2	25.9	30.9
553	29.5	34.3	33.8	34.3	35.2	28.6	33.9
571	22.0	26.0	25.6	26.0	26.8	21.2	25.6
902	23.3	27.5	27.0	27.4	28.2	22.5	27.1
903	22.6	26.7	26.3	26.7	27.5	21.9	26.3
904	17.4	20.8	20.4	20.8	21.4	16.7	20.4
981	32.3	37.3	36.8	37.3	38.2	31.4	36.9
Total	21.8	25.8	25.4	25.8	26.6	21.1	25.4

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.25

Predicted Probability of Air Force Post-Training Attrition by Last Duty Location and Air Force Specialty in the Skilled Technician Area

	Location						
AFSC	NE2	NC2	S2	W2	EUR2	PAC2	Total
202	9.0	11.9	9.1	9.6	4.7	6.2	9.0
207	16.7	21.6	16.8	17.8	9.1	11.9	16.8
208	10.2	13.5	10.3	10.9	5.4	7.1	10.2
231	46.6	54.6	46.9	48.5	30.5	37.0	46.8
251	36.1	43.8	36.4	38.0	22.1	27.6	36.3
272	16.9	22.0	17.1	18.1	9.3	12.1	17.1
274	19.7	25.2	19.9	20.9	10.9	14.1	19.8
276	32.1	39.5	32.4	33.9	19.2	24.2	32.3
291	33.7	41.2	34.0	35.5	20.3	25.5	33.9
293	29.8	36.9	30.0	31.4	17.6	22.2	29.9
303	28.5	35.4	28.7	30.1	16.7	21.1	28.6
304	31.0	38.3	31.3	32.7	18.4	23.2	31.2
305	20.8	26.6	21.0	22.1	11.7	15.0	21.0
306	36.2	43.9	36.5	38.1	22.2	27.7	36.4
307	22.5	28.6	22.7	23.9	12.7	16.4	22.7
316	19.3	24.7	19.5	20.5	10.7	13.8	19.4
321	20.8	26.6	21.1	22.2	11.7	15.1	21.0
325	20.6	26.4	20.8	21.9	11.5	14.9	20.8
326	20.8	26.6	21.0	22.1	11.6	15.0	20.9
328	28.1	35.0	28.4	29.7	16.4	20.8	28.3
341	18.6	24.0	18.8	19.8	10.3	13.3	18.7
463	30.7	37.9	31.0	32.4	18.2	23.0	30.9
553	33.7	41.2	34.0	35.5	20.3	25.5	33.9
571	25.5	32.0	25.7	27.0	14.6	18.7	25.6
902	26.9	33.6	27.1	28.5	15.6	19.8	27.1
903	26.2	32.9	26.4	27.7	15.1	19.3	26.3
904	20.3	26.0	20.5	21.6	11.3	14.6	20.4
981	36.7	44.4	38.5	22.5	28.0	46.5	36.9
Total	25.3	31.8	25.5	26.8	14.5	18.5	25.4

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.26

Predicted Probability of Air Force Post-Training Attrition by First Duty Location and Air Force Specialty in the Functional Support and Administration Area

	Location						
AFSC	NE1	NC1	S1	W1	EUR1	PAC1	Total
271	80.1	77.4	79.8	81.1	73.0	76.8	79.4
511	14.7	12.8	14.5	15.5	10.4	12.4	14.2
602	78.0	75.2	77.7	79.1	70.4	74.5	77.2
605	77.4	74.5	77.1	78.5	69.7	73.9	76.6
645	34.6	31.1	34.2	36.1	26.2	30.4	33.6
672	22.8	20.1	22.5	23.9	16.5	19.6	22.0
701	31.9	28.6	31.5	33.3	23.9	27.9	31.0
702	28.9	25.8	28.5	30.2	21.4	25.1	28.0
732	29.3	26.1	28.9	30.6	21.7	25.4	28.4
741	27.7	24.7	27.4	29.0	20.5	24.0	26.9
906	27.4	24.4	27.1	28.7	20.2	23.7	26.5
Total	34.8	31.3	34.4	36.3	26.4	30.6	33.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.27

Predicted Probability of Air Force Post-Training Attrition by Last Duty Location and Air Force Specialty in the Functional Support and Administration Area

	Location						
AFSC	NE2	NC2	S2	W2	EUR2	PAC2	Total
271	79.6	87.0	81.2	80.4	64.3	60.8	79.4
511	14.4	22.3	15.6	15.0	7.2	6.2	14.2
602	77.5	85.5	79.2	78.4	61.4	57.8	77.2
605	76.9	85.1	78.6	77.8	60.6	56.9	76.6
645	34.0	46.9	36.3	35.1	19.2	17.0	33.6
672	22.3	33.0	24.1	23.2	11.7	10.2	22.0
701	31.3	43.9	33.5	32.4	17.4	15.3	31.0
702	28.3	40.4	30.4	29.3	15.4	13.6	28.0
732	28.7	40.8	30.8	29.7	15.6	13.8	28.4
741	27.2	39.0	29.2	28.2	14.7	12.9	26.9
906	26.8	38.6	28.9	27.8	14.5	12.7	26.5
Total	34.2	47.1	36.5	35.3	19.3	17.1	33.8

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.28

Predicted Probability of Air Force Post-Training Attrition by First Duty Location and Air Force Specialty in the Electrical/Mechanical Equipment Repair Area

	Location						
AFSC	NE1	NC1	S1	W1	EUR1	PAC1	Total
361	34.7	32.4	32.8	33.8	29.8	30.0	32.5
362	27.2	25.2	25.5	26.5	23.0	23.1	25.3
423	29.3	27.2	27.5	28.5	24.9	25.0	27.3
426	34.9	32.6	33.0	34.0	30.0	30.2	32.7
431	32.9	30.6	31.0	32.0	28.2	28.3	30.7
443	25.3	23.5	23.8	24.7	21.4	21.5	23.5
461	31.0	28.9	29.2	30.2	26.5	26.6	29.0
462	28.7	26.6	27.0	27.9	24.4	24.5	26.7
472	40.4	37.9	38.3	39.5	35.2	35.3	38.0
541	29.1	27.1	27.4	28.4	24.8	24.9	27.2
542	30.7	28.6	28.9	29.9	26.2	26.3	28.7
Total	31.8	29.6	29.9	31.0	27.2	27.3	29.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.29

Predicted Probability of Air Force Post-Training Attrition by Last Duty Location and Air Force Specialty in the Electrical/Mechanical Equipment Repair Area

	Location						
AFSC	NE1	NC1	S1	W1	EUR1	PAC1	Total
361	32.9	41.9	33.8	33.6	21.0	18.2	32.5
362	25.7	33.7	26.4	26.3	15.7	13.5	25.3
423	27.7	36.0	28.5	28.3	17.1	14.8	27.3
426	33.1	42.1	34.0	33.8	21.1	18.3	32.7
431	31.2	39.9	32.0	31.8	19.6	17.0	30.7
443	23.9	31.6	24.6	24.5	14.5	12.5	23.5
461	29.4	37.9	30.2	30.0	18.3	15.9	29.0
462	27.1	35.3	27.9	27.7	16.7	14.4	26.7
472	38.5	47.9	39.5	39.2	25.3	22.1	38.0
541	27.6	35.8	28.3	28.2	17.0	14.7	27.2
542	29.1	37.6	29.9	29.7	18.1	15.7	28.7
Total	30.1	38.7	30.9	30.8	18.9	16.3	29.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.30

Predicted Probability of Air Force Post-Training Attrition by First Duty Location and Air Force Specialty in the Craftsmen, Service, and Supply Handlers Area

	Location						
AFSC	NE1	NC1	S1	W1	EUR1	PAC1	Total
427	32.8	32.0	28.3	30.6	24.1	21.1	30.0
545	31.5	30.7	27.1	29.3	23.1	20.1	28.7
547	28.0	27.2	23.9	25.9	20.2	17.5	25.4
552	28.6	27.9	24.5	26.5	20.7	18.0	26.0
566	28.8	28.0	24.6	26.7	20.8	18.1	26.1
603	29.5	28.7	25.3	27.4	21.4	18.7	26.8
611	32.3	31.5	27.8	30.1	23.7	20.7	29.5
622	31.1	30.3	26.7	28.9	22.7	19.8	28.3
631	26.7	26.0	22.7	24.7	19.1	16.6	24.2
811	46.9	45.9	41.6	44.3	36.4	32.5	43.5
915	58.1	57.2	52.8	55.5	47.4	43.1	54.8
922	24.9	24.2	21.1	23.0	17.8	15.4	22.5
Total	37.7	36.8	32.9	35.3	28.3	24.9	34.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

Table C.31

Predicted Probability of Air Force Post-Training Attrition by Last Duty Location and Air Force Specialty in the Craftsmen, Service, and Supply Handlers Area

	Location						
AFSC	NE1	NC1	S1	W1	EUR1	PAC1	Total
427	32.0	36.0	33.0	34.5	15.5	13.0	30.0
545	30.7	34.6	31.7	33.2	14.8	12.4	28.7
547	27.2	30.9	28.1	29.5	12.7	10.6	25.4
552	27.8	31.6	28.8	30.2	13.1	10.9	26.0
566	27.9	31.7	28.9	30.3	13.2	11.0	26.1
603	28.7	32.5	29.7	31.1	13.6	11.4	26.8
611	31.4	35.5	32.5	34.0	15.2	12.7	29.5
622	30.2	34.2	31.2	32.7	14.5	12.1	28.3
631	25.9	29.5	26.9	28.2	12.0	10.0	24.2
811	45.8	50.4	47.1	48.7	24.9	21.2	43.5
915	57.1	61.5	58.3	59.9	34.3	29.8	54.8
922	24.2	27.7	25.1	26.4	11.1	9.2	22.5
Total	36.8	41.1	37.9	39.5	18.6	15.6	34.7

NOTE: Each cell indicates the predicted attrition probability evaluated at the mean set of characteristics for individuals in the occupational area.

BIBLIOGRAPHY

Chow, Winston K., *A Look at Various Estimators in Logistic Models in Presence of Missing Values,* The Rand Corporation, N-1324-HEW, 1979.

Chow, Winston K., and J. Michael Polich, *Models of the First-Term Reenlistment Decision,* The Rand Corporation, R-2468-MRAL, September 1980.

Comptroller General of the United States, *Attrition in the Military—An Issue Needing Management Attention*, FPCD-80-10, February 20, 1980.

Goodstadt, Barry E., and Albert S. Glichman, *The Current Status of Enlisted Attrition in the U.S. Navy and in the U.S. Marine Corps and the Search for Remedies*, National Technical Information Service, AD-A018 234, November 1975.

Haggstrom, G. W., "Discriminant Analysis and Logistic Regression," unpublished notes, 1974.

Halperin, M., W. C. Blackwelder, and J. I. Vorter, "Estimation of the Multivariate Logistic Risk Function: A Comparison of the Discriminant Function and Maximum Likelihood Approaches," *Journal of Chronic Diseases,* Vol. 24, 1971, pp. 125-158.

Jovanovic, Boyan, "Job Matching and the Theory of Turnover," *Journal of Political Economy,* Vol. 87, No. 5, Pt. 1, 1979.

Lockman, Robert F., "A Model for Estimating Premature Losses," *Defense Manpower Policy: Presentations from the 1976 Rand Conference on Defense Manpower,* The Rand Corporation, R-2396-ARPA, December 1978.

Sinaiko, H. Wallace (ed.), *First-Term Enlisted Attrition: Vol. I, Papers,* Office of Naval Research, Washington, D.C., June 1977.

Smith, James P., and Finis Welch, *Black/White Male Earnings and Employment: 1960-1970,* The Rand Corporation, R-1666-DOL, June 1975.

Smith, James P., and Finis Welch, *Race Differences in Earnings: A Survey and New Evidence,* The Rand Corporation, R-2295-NSF, March 1978.

Thomason, James, *First-Term Survival and Reenlistment Chances for Navy Ratings and a Strategy for Their Use,* Center for Naval Analyses, CRC 382, May 1979.

Thomason, James, *Rating Assignments to Enhance Retention,* Center for Naval Analyses, CRC 426, February 1980.

Warner, John T., *The Prediction of Attrition from Military Service,* Center for Naval Analyses, CRC 345, September 1976.

Welch, Finis, "Black-White Returns to Schooling," *American Economic Review,* Vol. 63, December 1973, pp. 225-240.

Youngblood, Stuart A., Bruce M. Meglino, William H. Mobley, and Dorothy P. Moore, *A Cross Sectional Analysis and Generalizability Implications of a Military Attrition Model,* Center for Management and Organizational Research, January 1980.